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FOREWORD

Since the early days of submarine warfare, the sophistication of the field has escalated dramatically. Defense of this advanced threat prompted on-scene computer-aided prediction and detection techniques. The ICAPS programs explained in this text assist in providing the necessary edge against the hazard of underwater aggression. The ICAPS programs integrate oceanographic concepts, specific environmental parameters, and tactical expertise to form a rapid and accurate system for on-scene analysis. This clear presentation of the operating procedures serves to encourage the use of ICAPS as a vital defensive tool and to disseminate information required for its effective utilization.

W. C. Palmer
Captain, USN
Commanding Officier

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REPORT DOCUMENTATION PAGE

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On-Scene Prediction	ASRAPC	ADEP
Operator's Manual	LATRAN	TASDA
PROFGEN	GENRAYT	TAPS
ODA	SHARPS	COMPASS

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This document introduces, explains, and provides detailed guidance for use of the ICAPS system and software suite. Step-by-step instructions for each program quickly direct the user from the initial time, temperature, and location data to a superior tactical assessment and prediction of submarine detection. The programs are described as follows:

PROFGEN -- Generates a sound speed profile based on bottom type and historical data. → cont

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ODA -- Aids analysis of ocean thermal and acoustic properties.

FACT -- Provides passive propagation loss predictions for various source-receiver pairs and frequencies.

ASRAPC -- Converts propagation loss information into tactical parameters.

LATRAN -- Computes lateral range curves based on the FACT data.

GENRAYT -- Provides additional options for ray trace graphics and allows input of SVP data or temperature and salinity data.

SHARPS -- Relates sonar operational capabilities for the active and passive propagation loss modes.

ACTIVE -- Produces tables of detection ranges for active sonobuoys.

ADEP -- Computes detection probabilities for 12 sonobuoy patterns.

TASDA Package -- Defines the detection capabilities and effectiveness of operator selected sonobuoy fields.

TAPS -- Graphically presents the detection coverage of towed array sensors.

COMPASS -- Organizes search planning options and evaluates each step of the search.

Together these programs provide comprehensive, detailed, clear, accurate, and rapid on-scene analysis of a submarine threat.

CHANGE RECORD

Change or Correction Number	Date of Change	Date Entered	By Whom	Reason for Change
	Apr 79			Original issue
Revision A	Jun 81			This document reflects changes to over 50 percent of the previous issue. Thus, in accordance with MIL-STD-490, it shall be considered a complete revision, Revision A. Symbols are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

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1.0 INTRODUCTION

1.1 PURPOSE

This Program Operating Procedures Manual is intended to be the principal reference required for successful operation of the Integrated Command ASW Prediction System (ICAPS).

1.2 SCOPE

All information for preparing the system hardware and executing the mission software is provided in this manual in sufficient detail such that no other reference is required for normal system utilization by a trained operator. This manual includes basic introductory material as well as specific, step-by-step instructions in a "cook book" style format for executing each program in the ICAPS software suite. It has been structured to serve the needs of both the novice and the trained operator. Additional background information and specific acoustic parameter selection guidance useful in optimizing ICAPS products is contained in RP-24B.

2.0 SYSTEM DESCRIPTION

The Integrated Command ASW Prediction System (ICAPS), developed by the Naval Oceanographic Office (NAVOCEANO), enables on-scene computerized processing of oceanographic environmental data in order to rapidly provide tailored acoustic and tactical information for direct support of fleet ASW operations. ICAPS currently provides ASW support for aircraft carrier ASW Modules (CV-ASWM) and land based ASW Operations Centers (VP-ASWOC). In most ASW control centers, a Fast Time Analysis System (FTAS) computer is used for ICAPS processing through a special ICAPS interfacing system which allows processing with little effect on FTAS capability.

2.1 SYSTEM HARDWARE

All ICAPS hardware is commercial "off the shelf" equipment. Command information is entered into the system by an operator through a console keyboard. The data is then processed by the NOVA 820 computer and the results shown on the terminal display screen. This data can be stored on cartridge tape, a disk, or copied from the display screen through the use of a hardcopy unit. A description of the ICAPS components follows and a picture of the ICAPS hardware for FTAS augmentation is shown in Figure 2-1. Figure 2-2 represents the ICAPS/NOVA hardware configuration in conceptual form.

NOVA 820 Digital Computer. The NOVA 820 is a general purpose Data General computer containing 32K, 16-bit words of memory, a hardware multiply/divide instruction, and four 16-bit accumulator registers. The NOVA system has a full line of instructions for memory referencing, input, output, arithmetic logic, and sense switching. In a FTAS augmented ICAPS, the NOVA 820 is shared with the FTA system.

XEBEC XDF-50 Disk-Controller System. The disk controller monitors all functions of data transfer and disk drive motion between the NOVA computer and the disk drive unit. It is a self-contained unit with timing, control logic, and a built-in power supply.

EMM (formerly CAELUS) Disk Cartridge Drive. The EMM model 306 D/2 disk provides a 6-megabyte storage capability for general purpose, digital minicomputers. The recording media consists of a removable CAELUS CM 111 (IBM 5440 type) disk-cartridge and a disk permanently fixed in the drive unit. Data recording is accomplished through two moving read/write heads. Data are recorded at a density of 2200 BPI. This disk drive unit is the primary storage media of all data and application programs required for the ICAPS system.

TEKTRONIX R4012 Computer Display Terminal. This Tektronix unit is a graphics computer terminal. It has a combined typewriter/teletype style keyboard that permits manual entry of alphanumeric, graphic and control characters, with full ASCII capability. The terminal contains a teletype port interface unit that provides the necessary format conversion, logic levels, and interfacing connections for communication between the R4012 terminal and the NOVA computer. All operator input to the ICAPS software and all output data are displayed on the Tektronix graphics terminal.

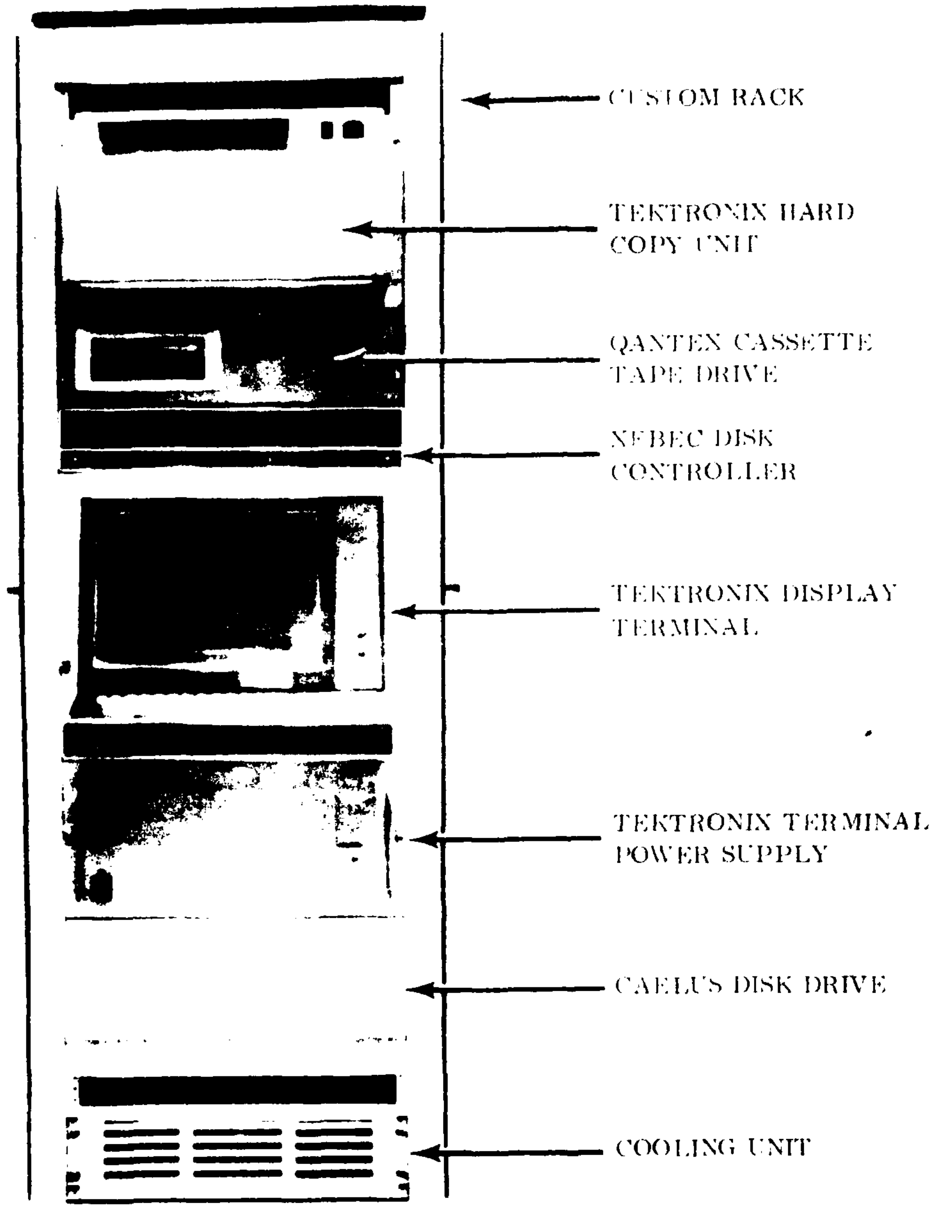


Figure 2-1. ICAPS Peripheral Hardware In Rack for FTAS Augmentation

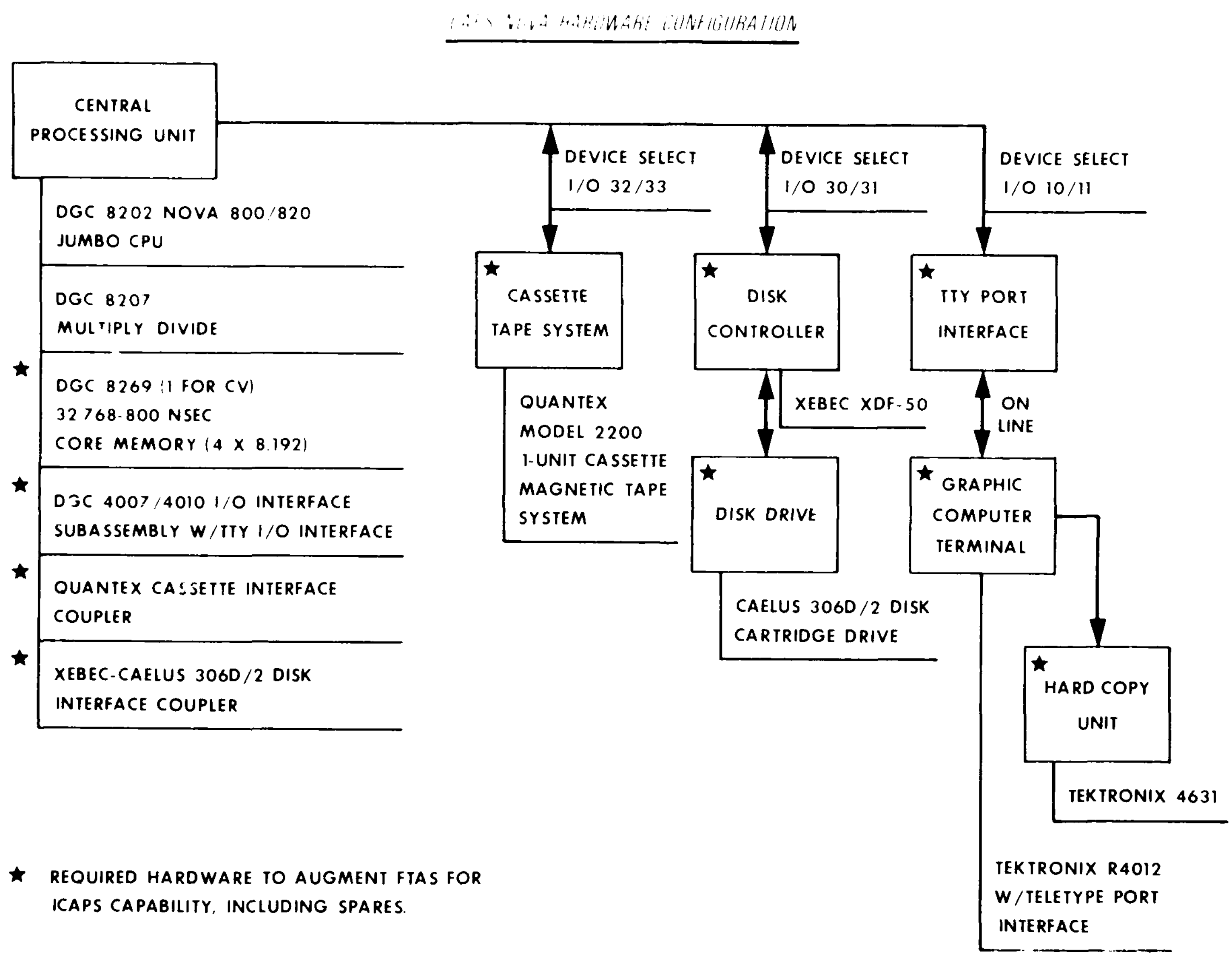


Figure 2-2. ICAPS/NOVA Hardware Configuration

TEKTRONIX 4631 Hard Copy Unit. The Tektronix hard copy unit makes an 8-1/2 by 11-inch reproduction of data displayed on the R4012 graphics computer terminal. This unit provides the ICAPS operator with a hard copy of program output for use in briefings or mission planning.

QANTEX Cassette Magnetic Tape System. The Qantex provides a backup method to load diagnostic programs independent of the disk, along with secondary storage of environmental and system data. This unit is functionally identical to the one which is currently integrated into PP #1 of FTAS.

2.2 SYSTEM SOFTWARE

ICAPS consists of system software and application software. The system software encompasses the Xebec Disk Operating System (XDOS) developed by Xebec Corporation and other software developed by Data General Corporation, such as the Text Editor, FORTRAN compiler, and Binary Loader.

XDOS is a general purpose minicomputer operating system that provides the user with a convenient means of controlling and performing the normal tasks required for program development and maintenance such as source editing, compiling, and debugging. In addition, it provides the user with a simple and uniform interface for transferring files of data between programs and the input/output (I/O) devices available through XDOS.

2.3 APPLICATION SOFTWARE

ICAPS is an integrated collection of programs written in FORTRAN IV which load from the disk into the computer for execution at the discretion of the operator. From the operator's console, while XDOS is in executive mode, the operator types the command for XDOS to load and execute a particular application program. When the program starts execution, XDOS relinquishes control to the program in user mode. Each of the programs functions interactively with the operator and queries the operator's console for required data inputs. If errors are diagnosed in the inputs, appropriate messages and alerts are issued to the operator.

General features of the ICAPS software are:

- Interaction in a Conversational Mode
- Easy Maintenance
- Diagnostic Routines
- Benchmark Comparison
- Automated Historical Data Retrieval
- Automated Synoptic Data Retrieval

The ICAPS software is designed to reflect the impact of changing ocean environment on tactical sensor performance. The software package may be divided into four main sections with their corresponding models defined in Table 2-1.

2.3.1 ICAPS Program Flow

The model that serves as a driver to the rest of the ICAPS software is the Profile Generator (PROFGEN) model, which creates a sound speed profile from environmental input. PROFGEN requires operator input of certain parameters and retrieves other data from historical files stored in ICAPS.

TABLE 2-1. ICAPS PROGRAM LIBRARY

Environmental

1. PROFGEN - generates a sound speed profile
2. GENRAYT - produces ray traces
3. ODA - aids analysis of ocean thermal and acoustic properties

Acoustic

4. FACT - provides passive acoustic propagation loss
5. LATRAN - yields passive lateral range predictions
6. ASRAPC - converts prop loss information into tactically useful parameters
7. SHARPS - supplies active acoustic capabilities
8. ACTIVE ASRAP - predicts active sonobuoy ranges

Tactical

9. ADEP - computes detection probabilities for 12 sonobuoy patterns
10. TAPS - provides detection coverage for surface unit towed array systems
11. TASDA - predicts passive sonobuoy field detection
12. COMPASS - aids in planning search options

Utility

13. PRISM - provides profile storage and retrieval via cassette tape
14. ICAPFILE - provides review of intermediate work file

Wilson's equation is used to calculate a sound speed profile from temperature, salinity and depth data. The sound speed profile and other pertinent data are stored in an intermediate system file, Z999ICAP:IM, available to other programs requiring this information. Alternately, the General Ray Trace (GENRAYT) model may be used to directly enter a surface to bottom sound speed profile or temperature and salinity data from which a sound speed profile is calculated. In either case, the sound speed profile is written to Z999ICAP:IM. The Oceanic Data Analysis (ODA) package may be used to evaluate multiple temperature or sound speed profiles to arrive at a single profile representing a particular area. The selected profile can be "restored" to Z999ICAP:IM for further processing.

The information stored in Z999ICAP:IM coupled with additional operator input, is used to calculate either active or passive acoustic propagation loss. The Ship Helicopter Acoustic Range Prediction System (SHARPS) and the Active Acoustical Sensor Range Prediction (ASRAP) model active acoustic sensor performance in ICAPS. The Fast Asymptotic Coherent Transmission (FACT) model is utilized for passive acoustic propagation loss calculations at operator-selected frequencies and source/receiver depths.

FACT stores this prop loss information in Z999ICAP:IM for use by other programs. The Lateral Range model produces probability of detection (POD) versus range curves from the FACT output, while the Compacted ASRAP (ASRAPC) model reads the prop loss information and computes Median Detection Range (MDR) and POD for Convergence Zone (CZ) and Bottom Bounce (BB) modes if they exist at specified Figures of Merit (FOM's). The Automated Detection Prediction (ADEP) model and the Tactical ASW Sonar Division Aid (TASDA) model use FACT prop loss information to evaluate sonobuoy patterns, while the Towed Array Prediction System (TAPS) uses this information to evaluate task force utilization of towed arrays. The Computer Assisted Search Series (COMPASS) uses FACT output in planned search efforts for detection of submarines.

Z999ICAP:IM is an important system file of which the operator should have a clear understanding. To eliminate confusion, the entire intermediate file Z999ICAP:IM is overwritten (erased) each time a new PROFGEN run is made, or whenever GENRAYT is used to create a sound speed profile from operator input of sound speed data or temperature and salinity data. As an aid to the operator, two utility programs are also included in ICAPS. The first program, ICAPFILE, presents a summary of the contents of the intermediate file Z999ICAP:IM so that the operator knows exactly what information is being utilized by a particular program that relies on the intermediate file for input. The second utility program, PR Information Storage Method (PRISM) is included to permit the operator to save the contents of Z999ICAP:IM on cassette tape for future reference, since the intermediate file is constantly being overwritten each time PROFGEN is run. Recall, however, that the contents of Z999ICAP:IM remain intact until changed by a subsequent execution.

A diagram of the ICAPS program flow is presented in Figure 2-3.

2.3.2 ICAPS Water Mass History File

An important element of the ICAPS system is the historical oceanographic data file of temperature and salinity at certain standard depths. The ICAPS historical data file is based on water mass concepts, rather than geographical boundaries alone. There is an historical temperature-salinity profile for each unique water mass within a 1° rectangle. To avoid duplication, 1° rectangles with common water masses are grouped into regions. Due to computer storage

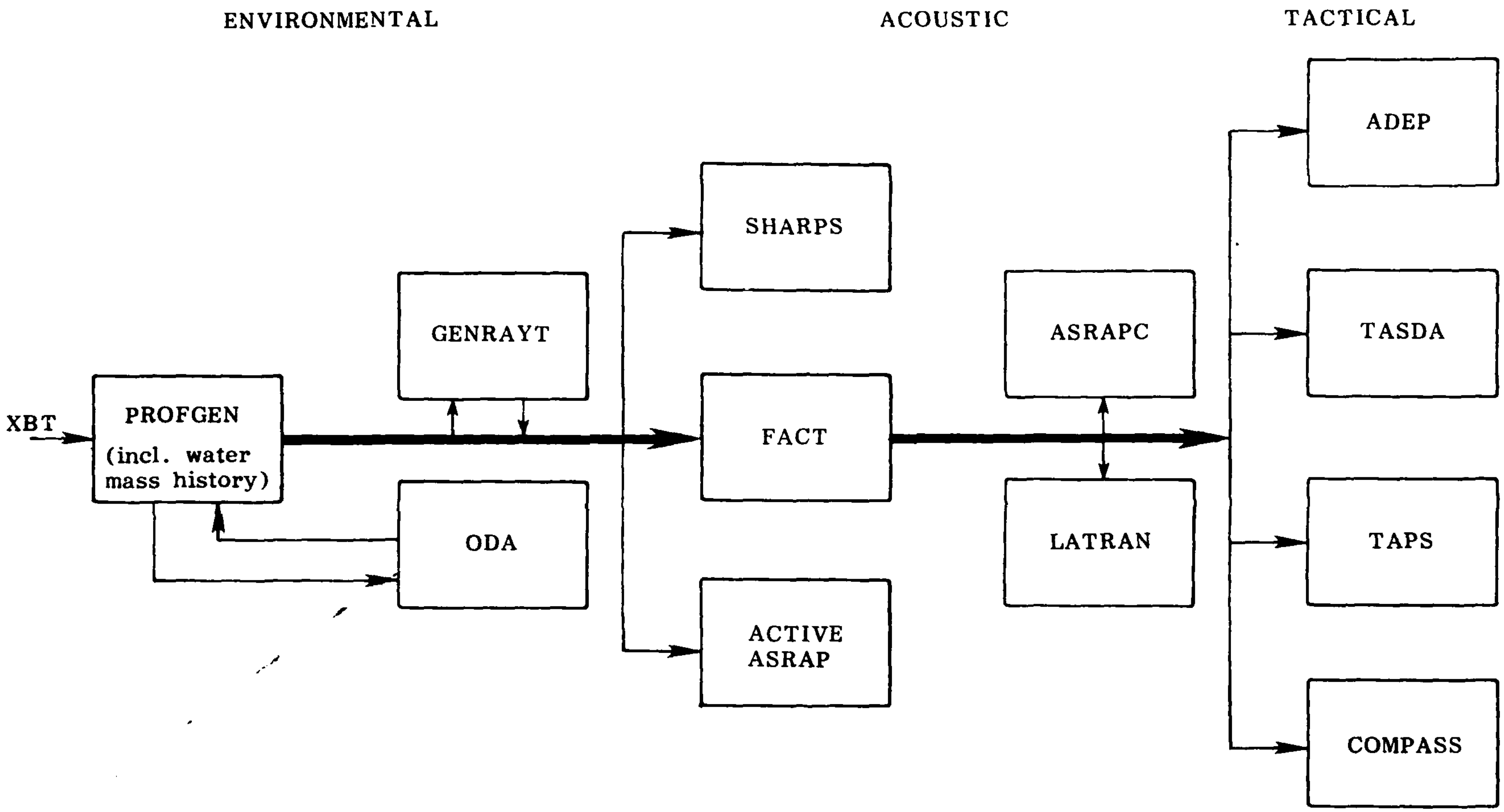


Figure 2-3. Conceptual Diagram of ICAPS Program Flow

limitations, the oceans are divided into areas (Figure 2-4), each consisting of numerous regions (Figure 2-5). Table 2-2 shows water mass information for Atlantic Area A.

Classical water mass theory was used in the determination of the ICAPS water masses. However, the water mass concept used in the ICAPS water mass file does not completely correspond to classical water mass theory. Original oceanographic data supplied the basis for determining the water masses. Two NAVOCEANO data files were used: 1) an oceanographic station data file of approximately 491,000 observations compiled by the National Oceanographic Data Center (NODC) provided temperature and salinity data at each of the (NODC) 32 standard depths between the sea surface and 7,000 m; 2) an XBT file of approximately 218,000 observations compiled from three sources (NAVOCEANO, NODC, and Fleet Numerical Oceanography Center) provided temperature data at each inflection point over the depth range of the instrument (as deep as 760 m).

The water masses were selected and verified using the following procedure: a) oceanographic literature was searched for classical water mass definitions; b) inflection points in the temperature versus salinity (T-S) plot were used to differentiate water masses; c) temperature and salinity gradients were plotted on histograms; d) the ocean station data file supplemented by the XBT data file was used to provide annual composite statistical data within an area; e) mean seasonal temperature and salinity profiles were developed and when necessary extrapolated to the bottom. These profiles were then checked against neighboring profiles for inconsistencies and errors.

In the oceans the greatest variation in temperature and salintiy occurs in the upper waters. The surface layer will often reflect even daily changes. Below the upper waters variations occur more gradually but with noticeable seasonal differences. ICAPS uses seasonal historical profiles to account for the seasonal variation. An on-scene BT which is representative of the actual surface thermal structure is used to replace the top portion of the seasonal historical temperature profile. This results in a surface to bottom historical profile which takes into account short time and seasonal variation in the upper waters. This composite profile reliably represents the actual environmental conditons present at the location where the BT was taken.

An ICAPS water mass is identified by the temperature range at 200 meters (m). Where more than one water mass exists in the same region with the same 200 m temperature range, the temperature gradient between 200 and 300 m is used for differentiation. As many as five water masses may be found in a subarea. Each water mass has a characteristic profile for each of the four seasons.

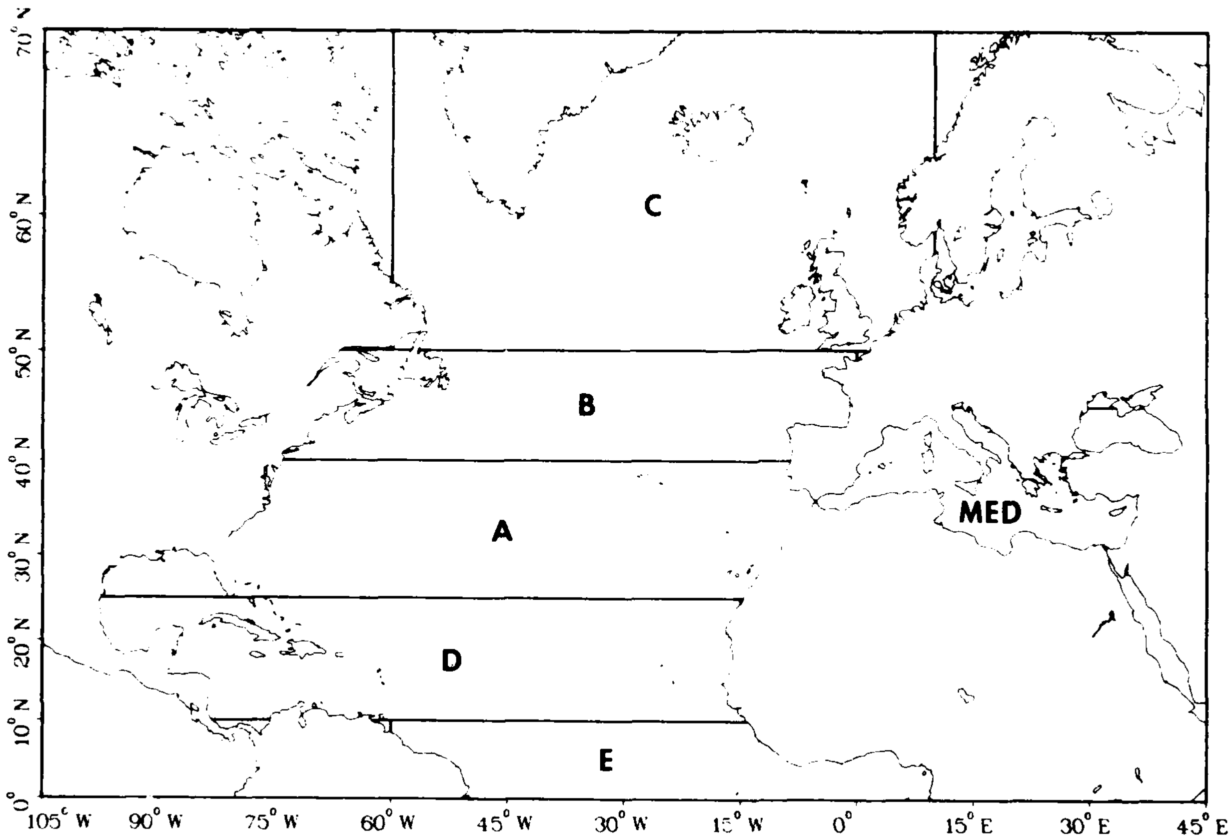


Figure 2-4. North Atlantic/Mediterranean Area Chart

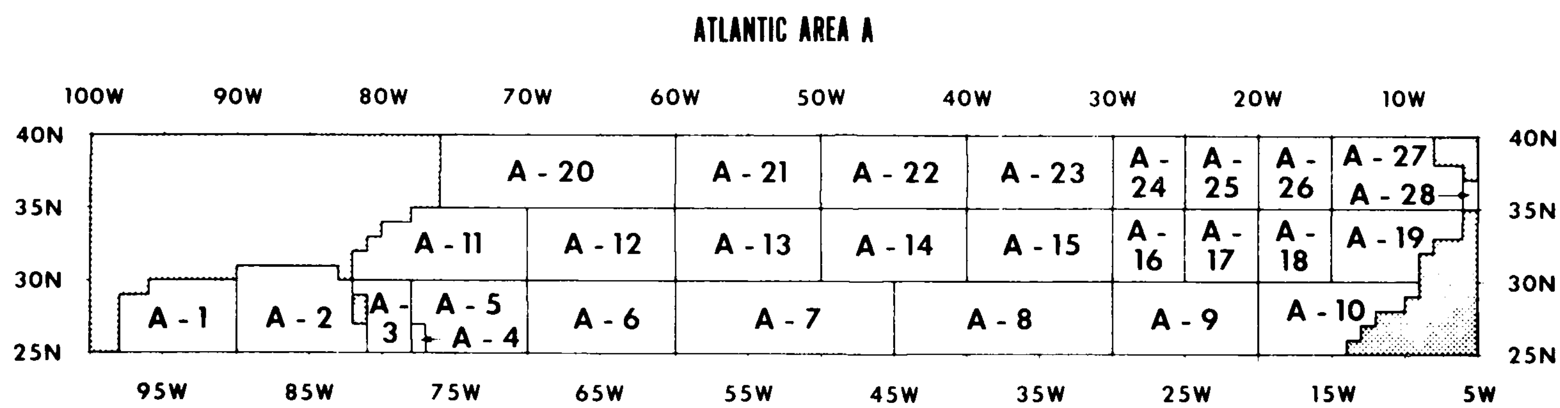
ATLANTIC AREA A

Region	Water Mass Name	T200 (°C) Min	T200 (°C) Max	DT (°C) Min	DT (°C) Max	Position	Freq. (%)
A1	W. GULF	10	15			[illegible]	[illegible]
	W. LOOP	15	25			[illegible]	[illegible]
A2	E. GULF	10	15			[illegible]	39
	E. LOOP	15	25			[illegible]	61
A3	SO. SLOPE	9	15			[illegible]	8
	COLD WALL	15	17			2	15
	FLORIDA CURRENT	17	25	-8.0	-1.6	[illegible]	59
	SARGASSO	17	25	-1.6	0.0	4	18
A4	G. ANTILLES	15	26	-8.0	-1.6	[illegible]	[illegible]
	SARGASSO	15	25	-1.6	0.0	[illegible]	[illegible]
A5	G. ANTILLES	15	25			[illegible]	100
A6	ANTILLES C.	15	25	-8.0	-1.6	1	24
	SARGASSO	15	25	-1.6	0.0	2	76
A7	ANTILLES C.	15	22	-8.0	-1.6	1	8
	SARGASSO	15	22	-1.6	0.0	2	92
A8	ATLANTIC CENTRAL	15	22			1	100
A9	S.E. LANT	13	20			1	100
A10	S.E. LANT	12	18			1	100
A11	SO. SLOPE	9	15			1	8
	STREAM	15	25	-8.0	-1.6	2	29
	SARGASSO	15	25	-1.6	0.0	3	63
A12	STREAM	15	25	-8.0	-1.6	1	2
	SARGASSO	15	25	-1.6	0.0	2	98
A13	SARGASSO	15	25			1	100

Region	Water Mass Name	T200 (°C) Min	T200 (°C) Max	DT (°C) Min	DT (°C) Max	Position	Freq. (%)
A14	Atlantic Central	[illegible]	[illegible]			1	100
A15	N.E. LANT	[illegible]	[illegible]			1	100
A16	N.E. LANT	12	18			1	100
A17	N.E. LANT	12	18			1	100
A18	S.W. GIBRALTAR	12	20			1	100
A19	[illegible] GIBRALTAR	12	20			1	100
A20	SCOTIAN	6	9			1	1
	SLOPE	9	15			2	58
	STREAM	15	25	-8.0	-1.6	3	13
	SARGASSO	15	25	-1.6	0.0	4	28
A21	SLOPE	9	15			1	13
	STREAM	15	25	-8.0	-1.6	2	8
	SARGASSO	15	25	-1.6	0.0	3	79
A22	TRANSITION	8	13			1	1
	DRIFT	13	25	-8.0	-1.6	2	3
	ATLANTIC CENTRAL	13	25	-1.6	0.0	3	96
A23	N.E. LANT	10	18			1	100
A24	[illegible] LANT	12	18			1	100
A25	N.E. LANT	12	18			1	100
A26	N.W. GIBRALTAR	10	18			1	100
A27	N.E. GIBRALTAR	10	18			1	100
A28	ATLANTIC	11	15	-6.0	-0.2	1	11
	GIBRALTAR	11	15	-0.2	0.0	2	89

Figure 2-5. Atlantic Area A Region Chart

TABLE 2-2. ICAPS ATLANTIC AREA A DATA CHART



3.0 EQUIPMENT OPERATING PROCEDURES

This section explains operating procedures for equipment start-up and shut-down. The correct sequence of events is outlined for normal, alternate, and manual methods of loading the equipment. If the equipment does not respond as indicated in the following instructions, DO NOT CONTINUE; notify maintenance for system analysis.

3.1 EQUIPMENT TURN-ON PROCEDURE

1. Perform visual inspection. Ensure that all cables are properly connected, cooling vents are clean, and non-essential items are removed from the immediate area.

2. Turn on the NOVA computer. Insert key into lock on the computer control panel and rotate the POWER switch to the ON position (Note: Do not rotate the POWER switch to the LOCK position; this will disable other computer controls on the front panel).

3. Turn on the Tektronix Hard Copy Unit by depressing the POWER ON switch.

4. Turn on the Qantex Tape Unit by activating the POWER switch.

5. Set the Tektronix keyboard unit controls:

   a) Turn on power.

   b) Place the LINE/LOCAL switch to the LINE position.

   c) Depress the TTY LOCK key to limit transmission to TTY code.

   d) Press the RESET key to erase CRT screen and to place cursor in "home" position (upper left corner of the CRT screen).

6. Verify that a magnetic Disk Pack is installed.

7. Apply power to the EMM Disk Drive Unit.

   a) Place POWER switch in the POWER position (push switch to the right). The POWER indicator should illuminate. Wait for the STOP light to come on.

   b) Place START/STOP switch in the START position (push switch to the right). STOP light will go off.

   c) Wait approximately one minute until READY indicator illuminates. The disk memory is now up to speed and heads are in position.

8. Verify indicator displays on XEBEC Disk Controller by observing illumination of all lights other than error light.

3.2 NORMAL SYSTEM LOADING PROCEDURE

1. Load the program monitor software using the controls on the front panel of the computer (Note: The toggle switches are spring loaded to return to the center (OFF) position. Switch register up position = 1; down position = 0).

   a) Place the STOP/RESET toggle switch to the STOP position to stop computer operations.

   b) Place the STOP/RESET toggle switch to the RESET position to clear all input/output flags and disable program interrupts.

   c) Set the switch register to the starting address of the system loader, octal value 77700 (binary equivalent: 111 111 111 000 000).

   d) Press RESET and then place the START/CONTINUE toggle switch in the START position. The program will stop at a halt instruction, octal 63077. At this position the address field contains octal 77701. If this does not occur, proceed to the alternate loading method.

   e) Specify the system device by setting the low order 3 bits of the switch register (bits 13, 14, 15) to one of the following octal values (normally 000).

Bit values	Device
000	Unit 0, Removable Disk (/XDPO)
001	Unit 0, Fixed Disk (/XPD1) (Note: Normal system operation utilizes the REMOVABLE Disk as the system device.

   f) Place START/CONTINUE toggle switch in CONTINUE position. The system loads from XDPO or XDP1 depending on selection.

2. Verify proper loading of the program monitor software.

   a) The error indicator on the XEBEC Disk Controller is not illuminated.

   b) The statement

      ≫ XDOS

      appears on the CRT screen. If either of these conditions is not satisfied, proceed to the alternate loading method.

3. Set switch register to octal 77777, the XDOS restart address.

4. Place the NOVA power switch to the LOCK position. (This disables the front panel switches of the NOVA).

5. System is now ready for program execution.

3.3 EQUIPMENT TURN-OFF PROCEDURE

If the equipment is to remain idle for less than one hour, execute sequence 1.a) - 1.c) and 2.a) only. To power down for a more extended period follow steps 1-7.

1. Set computer controls in the following manner:

    a) Rotate the NOVA power switch key from the LOCK to the ON position.

    b) Place STOP/RESET toggle switch in STOP position.

    c) Place STOP/RESET toggle switch in RESET position.

2. Turn off CAELUS Disk Drive in the following manner:

    a) Place STOP/START switch in STOP position (push switch to the left).

    b) Wait approximately one minute until the STOP indicator is illuminated. This signifies the disk memory is stopped.

    c) Place the POWER switch in unmarked position (push switch to the left).

3. Turn off Qantex Tape Unit by deactivating POWER switch.

4. Turn off the Tektronix Hard Copy Unit by depressing the POWER ON switch.

5. Clear Tektronix screen by depressing reset page key.

6. Turn off Tektronix keyboard.

7. Rotate the NOVA power switch key to the OFF position.

3.4 EMERGENCY TURN-OFF PROCEDURE

In the event of a critical emergency (e.g., fire, hazard to personnel, etc.), immediately disconnect electrical power to the affected unit by placing the appropriate power switch in the OFF position or by disconnecting the input power cable from the electrical outlet.

3.5 ALTERNATE LOADING PROCEDURE (SHORT BOOT)

1. Set the switch register to octal 00030.

2. Manually deposit into memory the following program load simulator:

    a. Place the EXAMINE/EXAMINE NEXT switch in the EXAMINE position.

    b. Set the switch register to octal 60130.

    c. Place the DEPOSIT/DEPOSIT NEXT switch in the DEPOSIT position. This deposits 60130 into location 30.

d. Set the switch register to octal 00400.

e. Place the DEPOSIT/DEPOSIT NEXT switch in the DEPOSIT NEXT position.

3. Set the switch register to octal 00030.

4. Press RESET and then START. The system loaded is executed, readying the system for program execution. "≫ XDOS" appears on the screen.

5. Set the switch register to octal 77777. Lock NOVA power switch. If the alternate loading procedure fails to activate the system loader, it may be loaded via the QANTEX tape unit.

3.6 SYSTEM LOADING FROM QANTEX TAPE PROCEDURE

The system backup tape contains a copy of the XDOS system loader and can be used in case the short boot fails. The following procedure is used to access the cartridge.

1. Place the system backup cartridge in the QANTEX unit and set the track select switch to the OFF position.

2. Manually deposit into memory the QANTEX bootstrap:

   a. Set the switch register to octal 00376.

   b. Place the EXAMINE/EXAMINE NEXT switch in the EXAMINE position.

   c. Set the switch register to octal 60122.

   d. Place the DEPOSIT/DEPOSIT NEXT switch in the DEPOSIT position. This deposits octal 60122 in location 376.

   e. Set the switch register to octal 00377.

   f. Place the DEPOSIT/DEPOSIT NEXT switch in the DEPOSIT NEXT position.

3. Set switch register to octal location 376.

4. Press RESET and START. The QANTEX bootloader (file 0 of the tape) is read into memory and can be used to access the system loader (file 1). The program will halt at octal address 77000.

5. Set the switch register to octal 77000.

6. Press START. The computer will halt immediately at octal location 77001.

7. Set the switch register to octal 77001 and press CONTINUE. The system loader will be read into memory and the computer will halt.

8. Continue with normal system loading procedures (i.e. step 1a in section 3.2). If the QANTEX loading procedures are unsuccessful, continue with the Manual Load Procedure.

3.7 MANUAL LOADING PROCEDURE

1. Set switch register to octal 77700 and proceed through Table 3-1, loading sequentially:

TABLE 3-1. MANUAL SYSTEM LOADER CONTENTS

$Location_8$	$Contents_8$	$Location_8$	$Contents_8$
77700	063077	77727	063530
77701	060477	77730	000777
77702	024445	77731	062630
77703	123620	77732	030423
77704	061230	77733	143404
77705	024443	77734	004744
77706	030443	77735	021513
77707	067031	77736	031400
77710	024442	77737	101113
77711	067030	77740	112415
77712	004406	77741	151015
77713	054104	77742	004736
77714	047523	77743	101112
77715	031060	77744	001440
77716	047117	77745	175400
77717	053101	77746	000767
77720	156460	77747	000007
77721	076030	77750	001000
77722	024431	77751	000113
77723	030431	77752	000100
77724	107002	77753	003000
77725	147000	77754	000400
77726	065130	77755	007774

2. Return the switch register to octal 77700.

3. Press RESET and then START. The program stops at the HALT instru-tion. Octal 77701 appears in the address field.

4. Set the low order 3 bits (13, 14, 15) to one of the octal values specified in Paragraph 3.2, Normal System Loading Procedure, Step 1.e).

5. Press CONTINUE. XDOS appears on CRT screen.

6. Set the switch register to octal 77777, the XDOS restart address.

7. Place NOVA power switch in the LOCK position.

8. System is now ready for execution.

3.8 RESTART FOLLOWING USER MODE FAILURE

To start the system after a user mode failure:

1. Set the switch register to octal 77777, the address of the last location of the system loader.

2. Press RESET and then START. The system transfers back to the executive mode.

3.9 SYSTEM LOADING ERRORS

System loading errors that occur prior to the completion of monitor loading are listed below. These errors are signaled by a program halt and their type is indicated by an address in AC3. For I/O errors, AC0 contains the error bits read from the disk controller status register.

Errors found in the addresses of AC3 relative to the start of the system loader (above octal location 77700) may be corrected by returning to Step 4 in Paragraph 3.7, Manual Loading Procedure. Absolute addresses are for automatic system loading errors and may be circumvented by re-initiating the Alternate Loading Procedure.

The system loading errors follow:

$AC3_8$	Error
(77743)	System not on device or not properly generated.
(77735)	I/O error during monitor loader loading. *
(77654)	I/O error during monitor loader loading. *
(77536)	I/O error during monitor loader loading. *
(77404)	I/O error during monitor loading. *
(77330)	Insufficient memory to load system.
(77314)	System not properly generated.
(00134)	I/O error during automatic system loading. *
(00041)	I/O error during automatic system loading. *
(00036)	I/O error during automatic system loading. *

*AC0 will contain the error bits input from the disk controller.

4.0 XDOS EXECUTIVE COMMANDS

A series of XDOS executive commands is provided to permit the user to control the functions of the NOVA 820 computer. A list of the more common commands is found in Table 4-1. Note that there should always be a blank space between the command and any parameters that are specified. For a complete list of available executive commands and a more detailed explanation of their function, see the XDOS Operating System Manual, Volume 1, Chapter 2.

In Table 4-1, the following conventions are used to describe the commands. Braces { }, enclose parameters which are optional. Brackets, [ ], enclose a set of two or more parameters from which one parameter must be selected. The parameters are described below:

n	Specifies a positive integer which is decimal if followed by a period, or octal otherwise.
d	Specifies a Type 1 (disk) device name.
f	Specifies a Type 1 file name.
f'	Specifies a Type 1 file name followed by an optional device name.
f*	Specifies a multiple file identifier.
f"	Specifies any type of file identifier
.	Specifies that the command output a listing on the CRT screen of the names of all the files which are affected by the command.
A	No restrictions. Files will be transferred regardless of whether or not they were initially defined on device d.
D	Only those files initially defined on device d will be transferred.
U	Only those files which are initially undefined on device d will be transferred.
O	Override write protect flag on files during transfer operation.
F	Restore protection flags to original state following transfer operation.
S	Equivalent to SPACE command when used in conjunction with LIST command.
D	The delete protect flag is set.
W	The write protect flag is set.
B	Both the delete and write protect flags are set.

TABLE 4-1. COMMONLY USED XDOS EXECUTIVE COMMANDS

COMMAND	ABBREVIATION	PARAMETERS	FUNCTION
ASNCON	AC	f'	Assign a file in place of the operator's console input.
CLRPFL	CF	$\begin{bmatrix} f' \\ f^* \end{bmatrix} \{, \ell\}$	Clear the protection flags on disk files.
COPY	C	$f'_1,\ f'_2\ \{,^n\}$	Copy one file into another.
DEFINE	DF	f'	Define a disk file.
DELETE	DL	$\begin{bmatrix} f' \\ f^* \end{bmatrix} \{, \ell\}$	Delete disk files.
INPUT	IP	$f'_1\ \{d\}, \begin{bmatrix} A\{O\} \\ D\{O\} \\ U \end{bmatrix} \{F\} \{, \ell\}$	Input disk files in output format.
LIST	LS	$\left\{\begin{bmatrix} d \\ f' \\ f^* \end{bmatrix}\right\} \left\{, \begin{bmatrix} S \\ \{S\},\ f' \end{bmatrix}\right\}$	List the name of files on a disk device.
OUTPUT	OP	$\begin{bmatrix} f' \\ f^* \end{bmatrix}, f' \{, \ell\}$	Output disk files in output format.
RENAME	RN	f', f	Rename a disk file.
RESCON	RC	None	Reset an operator's console assignment.
RESET	RS	None	Close all open files.
RUN	R	f'	Load and execute a program in user memory.
SETC	ST	$\{c\}, n$	Set contents of one or more memory locations to a specific valve (usually 0)
SETPFL	SF	$\begin{bmatrix} f' \\ f^* \end{bmatrix}, \begin{bmatrix} D \\ W \\ B \end{bmatrix} \{, \ell\}$	Set the protection flags on disk files.

TABLE 4-1. (Concluded)

COMMAND	ABBREVIATION	PARAMETERS	FUNCTION
SPACE	SP	d	List the space available on a disk device.
TRNSFR	TF	$\begin{bmatrix} f' \\ f^* \end{bmatrix}, \{d\}, \begin{bmatrix} A & \{O\} \\ D & \{O\} \\ U & \end{bmatrix} \{F\} \{, \ell\}$	Transfer files between disk devices.

OTHERS:	Special Function Keys
CONTROL-D	Transfers computer control from computer to user. (Always follow by typing in a RESET from keyboard).
RUBOUT	Depressing RUBOUT Key deletes one character to the left for each RUBOUT entered. RUBOUT is echoed back to the console as a reverse slash (\).
LINEFEED (LF)	Depressing LF key will initiate a hard copy of the CRT screen.

The following names are used to designate the various components of the ICAPS system:

/XDP0	Disk Unit - Removable Pack
/XDP1	Disk Unit - Fixed Pack
/TTO	Operator's Console
/CDT	Operator's Console - display format
/HCT	Hard copy unit
/CTU0	QANTEX Tape Unit

5.0 PROFILE GENERATOR (PROFGEN) MODEL

Program execution events are described in Table 5-1.

File Name: PROFGEN

Function: Merge bathythermograph data with historical temperature and salinity data and convert into a sound speed profile for a given date and location to drive the acoustic models.

Input: Console input includes date, geographical location, locally observed BT with up to 30 depth/temp. pairs (see ICAPS BT Input Form), and, optionally, the bottom depth, watermass, and operator-created name for a save file (see below). The necessary Historical Atlas File is automatically selected for input by the program. Note: The required atlas file may reside on either the removable (usually the system device) or the fixed disk. The program automatically searches the 'other' disk if atlas is not on system device.

Output: The input parameters, sound speed profile, and sonic layer depth (SLD) are stored in the intermediate work file Z999ICAP:IM and, optionally, stored in a save file specified by the operator. Bottom depth and high and low frequency acoustic bottom types retrieved from the historical files are also stored in the intermediate work file. PROFGEN displays the observed BT trace, the merge of historic and locally observed data, and the sound speed profile. These appear in both tabular and graphic forms.

Classification: Output displays coupling geographic location with acoustic bottom type are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, Naval Security Regulations.

Historical Data Files: The historical data from each ocean basin are divided into regions. There is a file for each region referenced by a unique file name. These file names are constructed as follows:

OCEAN	REGION	SEASON(for all oceans)
ATLantic (5 regions)	A-E	WINter (Jan - Mar)
PACific (7 regions)	A-G	SPRing (Apr - Jun)
INDian (4 regions)	A-D	SUMmer (Jul - Sep)
MEDiterranean (1 region)	M	FALl (Oct - Dec)

Characters 1-3 define the ocean. Character 4 denotes the region (refer to Figure 5 1). Characters 5-7 define the season. For example, file name ATLASUM is ATLantic Ocean, Region A, SUMmer season.

File Error Conditions: If the message ATLAS SOUGHT NOT ON SYSTEM PLATTER appears, or NO ICAPS HISTORICAL ATLAS EXISTS FOR THIS POSITION the program terminates. The file sought is named and may be transferred from another platter or tape. A QANTEX tape containing all of the ICAPS historical atlases is provided to each site at system installation time. The required atlas file(s) may be transferred from tape to the system platter for execution. The tape cannot be used for PROFGEN execution.

Detailed Watermass Information: In areas of multiple watermasses, a precise definition of each watermass is obtained by responding YES at event No. 13. The display is in metric units. The following definitions apply to the terms which appear:

T_{200} - Temperature (Celsius) at 200 meters

GL - Temperature gradient between 200 and 300 meters

$MINT_{200}$ - Minimum value of T_{200} for the watermass

$MAXT_{200}$ - Maximum value of T_{200} for the watermass

MINGL - Minimum GL for the watermass

MAXGL - Maximum GL for the watermass

Automatic Watermass Selection: When several watermasses exist in an area one is automatically selected by the program. Input of locally observed BT data allows watermass selection on the basis of T_{200} and GL values. Without BT data, the program selects the first watermass in the file. The operator has the option to change the selected watermass at event No. 15.

Save File: BT data stored by PROFGEN in file Z999ICAP:IM is used by successor programs (FACT, SHARPS, etc.), but is destroyed by a subsequent execution of PROFGEN or entering a sound speed or temperature/salinity profile in GENRAYT. The data may be saved for future use by automatically storing them in another user specified file. This option appears in event No. 18. The suffix ":PR" completesthe save-file name; references to the file outside of PROFGEN must include this designator.

Operator Interface:	The conversational format and operating sequence in Table 5-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.
Execution Time:	Immediate.

ICAPS BT INPUT

DAY/MONTH/YEAR ____________

TIME ____________

DATA UNITS ____________

LAT ____________

LONG ____________

BTM DEPTH ____________

	DEPTH	TEMPERATURE		DEPTH	TEMPERATURE
1.			16.		
2.			17.		
3.			18.		
4.			19.		
5.			20.		
6.			21.		
7.			22.		
8.			23.		
9.			24.		
10.			25.		
11.			26.		
12.			27.		
13.			28.		
14.			29.		
15.			30.		

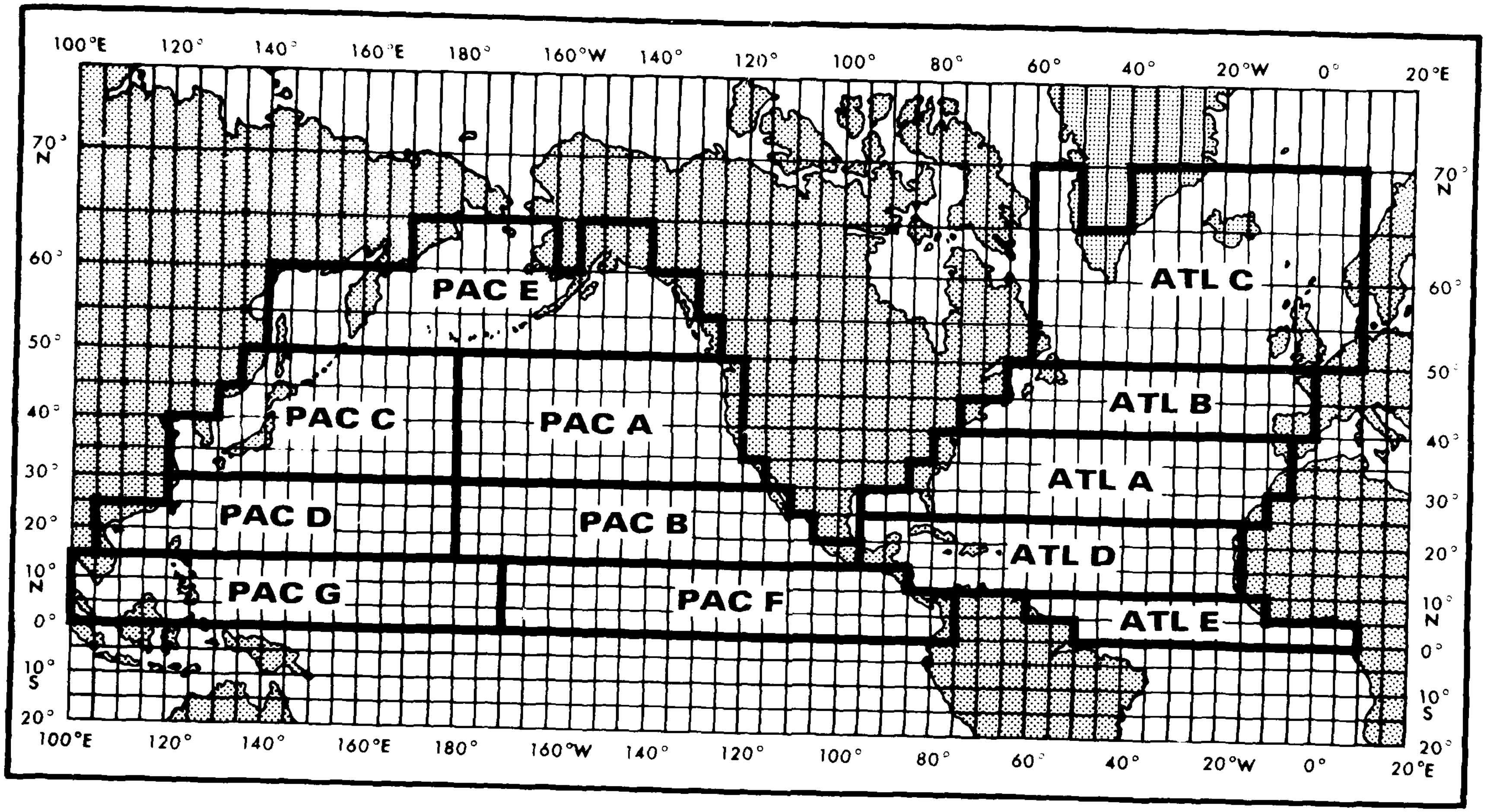


Figure 5-1. ICAPS Regions for the Atlantic and Pacific Oceans

TABLE 5-1. PROFGEN PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R PROFGEN Enter and press RETURN.	Initiates PROFGEN program.
2	CRT OPR	**ICAPS PROFILE GENERATOR PROGRAM** IS THIS A NEW RUN OR A RE-DISPLAY? 0 for redisplay, 1 for new run Enter 0 or 1 and RETURN.	Re-display is an option for graphics from a previous PROFGEN run. If 0, processing continues at event #20. (Note: For re-display in areas of multiple water masses the operator will have the option to change the selected water mass.)
3	CRT	DAY = MONTH = YEAR = LATITUDE = NORTH (1) - SOUTH (2) = LONGITUDE = EAST (1) - WEST (2) =	After each "=" sign, operator must insert value, then press RETURN key. Enter day, month, and year as one- or two-digit numbers. Enter latitude as a four-digit number (DDMM) and longitude in five digits (DDDMM).
4	CRT OPR	FILE XXXXX SELECTED BT FROM KEYBOARD (1 = YES, 0 = NO)? Enter 1 or 0 and RETURN.	Name of atlas file corresponding to area specified in event #3. If response is 0 (NO) processing continues at event #11.
5	CRT OPR	NUMBER OF DATA POINTS IN PROFILE = Enter number 2-30 and RETURN.	Maximum number of data points = 30. Minimum number of data points = 2.

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
6	CRT	UNITS OF DATA = (1 = METRIC, 2 = ENGLISH) ?	
	OPR	Enter 1 or 2 and RETURN.	
7	CRT	INPUT PROFILE DATA IN DEPTH-TEMPERATURE PAIRS	Enter as many pairs of depth and temperature as number of data points (event #5) in the appropriate units (event #6). Use 0 as initial depth value. After last entry program halts, bell rings.
	OPR	Enter (depth value), (temp. value) and RETURN.	Press LF for hard copy or RETURN.
8	CRT	BT DATA INPUT DO YOU WISH TO CHANGE ANY OF THE XX DEPTH-TEMPERATURE PAIRS (1 = YES, 0 = NO) ? =	BT profile data is displayed in tabular and graphic form for operator inspection. If 0 (NO), processing continues at event #13.
	OPR	Enter 0 or 1 and RETURN.	
9	CRT	NUMBER OF POINTS TO BE CORRECTED =	
	OPR	Enter number and RETURN.	
10	CRT	INPUT LINE NUMBER AND CORRECT DEPTH-TEMPERATURE PAIRS	Points must be entered sequentially. Enter as many sets of line number, depth, and temperature as number of points to be corrected. After last correction, processing continues at event #8.
	OPR	Enter (line no.), (depth), (temp.), RETURN.	
11	CRT	BT FROM A FILE (1 = YES, 0 = NO) ?	If 0 (NO) processing continues at event #13.
	OPR	Enter 1 or 0 and RETURN.	

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
12	CRT	NAME FILE FOR BT INPUT (1 TO 8 CHARACTERS)?	Enter file name only; extension ":PR" is automatically provided.
	OPR	Type in and RETURN.	Processing continues at event #8.
13	CRT	DO YOU WANT DETAILED WATER-MASS INFO FROM RETREV (1 = YES, 0 = NO) ?	If response is 0 (NO), processing continues at event #16.
	OPR	Enter 1 or 0 and RETURN.	If hardcopy desired press LF, otherwise RETURN.
14	CRT	WATERMASS X SELECTED BY PROGRAM.	If only one watermass in area, processing moves to #16.
		DO YOU WISH TO SPECIFY A WATERMASS OTHER THAN THE ONE SELECTED BY PROGRAM (1 = YES, 0 = NO) ?	If response is 0 (NO), processing moves to #16.
	OPR	Enter 1 or 0 and RETURN.	
15	CRT	SPECIFY ONE BY NUMBER FROM THOSE LISTED ABOVE.	Enter the number of the watermass desired for this run.
	OPR	Enter line number of desired water-mass and RETURN.	
16	CRT	BOTTOM DEPTH XXXX ACCESSED FROM FILES	If response is 0 (NO), processing continues at event #18.
		DO YOU WISH TO CHANGE BOTTOM DEPTH FROM XXXX METERS (1 = YES, 0 = NO)?	
	OPR	Enter 1 or 0 and RETURN.	

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
17	CRT	INPUT NEW BOTTOM DEPTH (METERS)? =	
	OPR	Enter bottom depth and RETURN.	
18	CRT	DO YOU WISH TO SAVE THE SOUND VELOCITY PROFILE IN ANOTHER FILE IN ADDITION TO SYSTEM FILE Z999ICAP:IM (1 = YES, 0 = NO) ? =	If 0 (NO) continue at event #21.
	OPR	Enter 1 or 0 and RETURN.	
19	CRT	NAME OF FILE (1 to 8 CHARACTERS)? =	Continue at event #21.
	OPR	Type in File name and RETURN.	
20	CRT	DO YOU WANT RERUN DATA TO COME FROM 1 - Z999ICAP:IM, OR 2 - A:PR FILE?	"A:PR" stands for a file name previously created of 1-8 alphanumeric characters. If 1, program reviews input parameters, then moves to event #21.
	OPR	Enter 1 or 2 and RETURN.	If 2, processing continues at event #19, then program reviews input parameters before moving to event #21.
21	CRT	*** ENVIRONMENTAL PROFILE DATA***	Display of BT, retrieved, and merged data in tabular form.
	OPR	Press RETURN.	When bell rings press LF for hard copy or RETURN.

TABLE 5-1. PROFGEN PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
22	CRT	***ENVIRONMENTAL PROFILE DATA***	Graphics of BT and historical, merged, and total profile data.
		Press RETURN.	When bell rings press LF for hard copy or RETURN.
23	CRT	SOUND VELOCITY PROFILE	Graphic & tabular display of the Sound Velocity Profile
	OPR		When bell rings press LF for hard copy or RETURN.
24	CRT	Add BT to ODA file (1 = YES, 0 = NO)?	If 0 (NO), processing continues at event #28. If 1 (YES) stores the BT into the ODA data file for use in that program. BT's added through PROFGEN become available for analysis in ODA.
	OPR	Enter 0 or 1, and RETURN.	
25	CRT	INPUT PLATFORM NAME:	Platform name must begin with "A" or "S" and have a maximum of six characters A = Aircraft S = Ship
	OPR	Enter name, and RETURN.	
26	CRT	INPUT TIME (HHMM):	
	OPR	Enter time, and RETURN.	
27	CRT	BT ADDITION TO ODA FILE COMPLETED.	
28	CRT	STOP.	

6.0 PR INFORMATION STORAGE METHOD (PRISM)

Program execution events are described in Table 6-1.

File Name:	PRISM.
Function:	This program stores save files created by the operator in PROFGEN on a data cartridge. These files are essentially copies of the contents of Z999ICAP:IM, which may include output from PROFGEN only or both PROFGEN and FACT output. Files can also be returned to the operating disk from cartridge. Additionally, the program keeps a directory which contains the file name, latitude, longitude, and date of each file on the cartridge.
Input:	Console input includes the name of the file that is to be either stored on cartridge or returned to the disk and the selection of a sort key for displaying a sorted directory.
Output:	The cartridge directory can be displayed on the screen at the user's request.
Operator Interface:	The conversational format and operating sequence in Table 6-1 describe the interchange of information between operator and CRT/keyboard under normal conditions.
Execution Time:	Immediate.

TABLE 6-1. PRISM PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R PRISM	Initiate program.
	CRT	IS THIS A NEW TAPE? (0 = NO, 1 = YES)	A new tape contains no save files.
	OPR	Enter 1 or 0 and RETURN.	If 1, go to event #10.
2	CRT	SELECT A COURSE OF ACTION (1) DISPLAY DIRECTORY (2) STORE A FILE ON CASSETTE (3) RESTORE A FILE ON DISK (4) END OF PROGRAM	If response to event #2: = 2, processing continues at event #8 = 3, processing continues at event #9 = 4, processing continues at event #11
	OPR	Input # of desired action.	
3	CRT	SELECT A SORT KEY (1) FILENAME (2) LATITUDE (3) LONGITUDE (4) DATE	If response to event #3: = 2, processing continues at event #5 = 3, processing continues at event #6 = 4, processing continues at event #7
	OPR	Input # of desired selection.	
4	CRT	Displays directory sorted on filename.	
	OPR	Press RETURN.	Processing continues at event #2.
5	CRT	Displays directory sorted on latitude.	
	OPR	Press RETURN.	Processing continues at event #2.
6	CRT	Displays directory sorted on longitude.	
	OPR	Press RETURN.	Processing continues at event #2

TABLE 6-1. PRISM PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
7	CRT	Displays directory sorted on date.	
	OPR	Press RETURN.	Processing continues at event #2
8	CRT	SPECIFY FILENAME:	
	OPR	Enter filename of file to be stored on cartridge. Press RETURN.	Processing continues at event #2
9	CRT	SPECIFY FILENAME:	
	OPR	Enter filename to be restored on disk. Press RETURN.	Processing continues at event #2
10	CRT	WARNING-YOU HAVE SPECIFIED A NEW TAPE. IF THIS IS NOT A NEW TAPE, ENTERING A "YES" ANSWER TO THE NEXT QUERY WILL DESTROY ALL EXISTING DATA ON THE CARTRIDGE. THIS CAN BE AVOIDED BY ENTERING A "NO" ANSWER.	
	CRT	WOULD YOU LIKE TO WRITE A FILE TO TAPE?	
	CRT	(0 = NO, 1 = YES)	If 0, processing continues at event #2 If 1, processing continues at event #8
	OPR	Enter 1 or 0 and RETURN.	
11	CRT	END OF RUN.	Program terminates

7.0 OCEANIC DATA ANALYSIS (ODA) PACKAGE

The ODA Package is presently under review as an enhancement to the ICAPS mission software suite, and upon final approval, will be distributed to operational ICAPS sites.

8.0 GENERAL RAY TRACE (GENRAYT) MODEL

Program execution events are described in Table 8-1.

File Name: GENRAYT

Function: The program generates sound velocity profile (SVP) and/or ray trace graphic displays. SVP data may be input via the console in either engineering or metric units or alternately, depth, temperature and salinity values are input and an SVP calculated. In either case, the resultant SVP is written to the intermediate file, Z999ICAP:IM. To generate a ray trace diagram, the existing SVP stored in the intermediate file is utilized. The operator has the option to enter bottom topographic data to define a variable depth bottom if desired. GENRAYT assumes a flat bottom in default of a bottom profile.

Input: GENRAYT reads the intermediate file, Z999ICAP:IM. Console input may include date, geographic location, source depth, initial angle, angle increment, number of angles, depression angle, maximum range, SVP or temperature, salinity values, and bottom definition.

Output: GENRAYT processes the SVP input and places the result in the file Z999ICAP:IM. SVP and ray trace graphics appear on the screen.

Operator Interface: The conversational format and operating sequence in Table 8-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: 10 seconds.

TABLE 8-1. GENRAYT PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R GENRAYT	Initializes program GENRAYT.
2	CRT	SELECT COURSE OF ACTION 1 = RAYTRACE 2 = SVP PLOT 3 = BOTTOM DEFINITION 4 = SVP INPUT 5 = END OF JOB	NOTE: If a new SVP is input via the console (option 4), the information will replace the SVP currently in Z999ICAP:IM.
	OPR	Enter 1, 2, 3, 4, or 5 and press RETURN.	
3	CRT	UNITS OF DATA (1 = ENGINEERING, 2 = METRIC) =	If response to event #2: = 1, program continues at event #4. = 2, program continues at event #6. = 3, program continues at event #8. = 4, program continues at event #13. = 5, program continues at event #23
	OPR	Enter 1 or 2 and RETURN.	
4	CRT	MAXIMUM RANGE (KYD, KM) = SOURCE DEPTH (FT, M) = INITIAL ANGLE = ANGLE INCREMENT = NUMBER OF ANGLES = DEPRESSION ANGLE =	
	OPR	Respond to each query as it appears and press RETURN.	Maximum acceptable range is 400 KYD, KM). Enter angles in degrees; negative is upward from the horizontal, positive is downward. Angles should not exceed ± 85°. NOTE: Unless a variable hull-mounted sonar is used, a zero should be input for depression angle.

TABLE 8-1. GENRAYT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
5	CRT	Displays RAYTRACE graphic. 'BELL' rings.	
	OPR	Press LF or RETURN.	Program continues at event #2.
6	CRT	Displays SOUND VELOCITY PROFILE. 'BELL' rings.	
	OPR	Press LF or RETURN.	
7	CRT	Screen is erased; displays "END SVP"	Program continues at event #2.
8	CRT	NUMBER OF BOTTOM RANGE/DEPTH PAIRS =	
	OPR	Enter number from 2 to 50 and RETURN.	
9	CRT	BOTTOM RANGE/DEPTH PAIRS - (KYD, FT), (KM, M)	xxx and yyyy are range and depth values, respectively.
	OPR	Enter range/depth pairs as follows: xxx, yyyy RETURN (etc.).	When number of pairs indicated in event #8 are entered, program proceeds to event #10. Note: Ranges must be entered in ascending order.
10	CRT	Displays pairs entered: LINE NUMBER RANGE DEPTH Requests: DO YOU WANT TO CHANGE ANY OF THE zz INPUT DATA SETS (1 = YES, 0 = NO)	zz is number of paris entered in event #8.
	OPR	Enter 1 or 0 and press RETURN.	If response is: 0, program continues at event #2. 1, program continues at event #11.

TABLE 8-1. GENRAYT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
11	CRT	NUMBER OF POINTS TO BE CORRECTED =	
	OPR	Enter number of points to be changed and press RETURN.	
12	CRT	INPUT LINE NUMBER AND CORRECT RANGE/DEPTH PAIRS	nn, xxx, yyyy are, respectively: Line number from display in event #10, Correct range, Correct depth. When number of points indicated in event #11 are entered, program continues at event #10.
	OPR	Enter corrected values as follows: nn, xxx, yyyy RETURN (etc.).	
13	CRT	DATE (DD, MM, YY) = LATITUDE (DDMM) = INS (1 = N, 2 = S) = LONGITUDE (DDDMM) IEW (1 = W, 2 = E) = NUMBER OF DATA POINTS IN PROFILE = INPUT DATA TYPE (1 = DEPTH/ TEMP/SALINITY, 2 = DEPTH/ VELOCITY) =	If data type response is: 1, program continues at event #14. 2, program continues at event #15.
	OPR	Respond to each query as it appears and press RETURN.	
14	CRT	DEPTH/TEMP/SALINITY FEET/FAHR/PPT or METER/CENT/PPT	Units displayed depend on units selected at event #3. When number of points indicated in event #13 are entered program continues at event #16.

TABLE 8-1. GENRAYT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
	OPR	Enter depth/temp/salinity triads as follows: DDDD, TT. T, SS. SS RETURN (etc.).	Note: Depths must be entered in ascending order.
15	CRT	DEPTH/VELOCITY FEET//FEET/SEC or METER//METER/SEC	Units displayed depend on units selected at event #3.
	OPR	Enter depth/velocity pairs as follows: DDDD, VVVV. V RETURN (etc.).	When number of points indicated in event #13 are entered program continues at event #16. Note: Depths must be entered in increasing order.
16	CRT	Displays data entered. Requests: DO YOU WANT TO CHANGE ANY OF THE xx SVP INPUT DATA SETS (1 = YES, 0 = NO)?	xx is the number of data points entered at event #14 or #15.
	OPR	Enter 1 or 0 and RETURN.	If response is: 0, program continues at event #20. 1, program continues at event #17.
17	CRT	NUMBER OF POINTS TO BE CORRECTED =	If D/T/S data was input, program continues at event #18.
	OPR	Enter number and press RETURN.	If D/V data was input, program continues at event #19.
18	CRT	INPUT LINE NUMBER AND CORRECTED D/T/S DATA SETS	
	OPR	Enter corrected values as follows: NN, DDDD, TT. T, SS. SS RETURN (etc.).	When number of points indicated in event #17 are entered, program continues at event #16.

TABLE 8-1. GENRAYT PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
19	CRT	INPUT LINE NUMBER AND CORRECTED D/V DATA	
	OPR	Enter corrected values as follows: NN, DDDD, VVVV. V RETURN (etc.).	When number of points indicated in event #17 are entered, program continues at event #16.
20	CRT	SONIC LAYER DEPTH (METERS) or (FEET) =	Unit displayed depends on units selected at event #3.
	OPR	Enter value and press RETURN.	
21	CRT	LOW FREQUENCY (LT 1000 Hz) BOTTOM TYPE (1-5) =	
	OPR	Enter 1, 3, or 4 and press RETURN.	
22	CRT	HIGH FREQUENCY (GE 1000 Hz) BOTTOM TYPE (1-9) =	
	OPR	Enter number 1-9 and press RETURN.	Program continues at event #2.
23	CRT	END GENERAL RAY TRACE PROGRAM STOP	Program is completed; control returns to XDOS monitor

9.0 FAST ASYMPTOTIC COHERENT TRANSMISSION (FACT) MODEL

Program execution events are described in Table 9-1.

File Name: FACT

Function: FACT is the Navy Standard passive propagation loss model. FACT assumes an omnidirectional receiver, a horizontally homogeneous environment (thus uses a single sound speed profile), and a flat bottom environment.

Propagation loss values are computed at one kiloyard intervals out to a maximum range of 200 kiloyards for up to three operator specified source-receiver pairs and up to four frequencies for a given bottom province, wave height, and sonic layer depth.

Input: The program reads the intermediate file, Z999ICAP:IM, containing the PROFGEN input parameters, the computed sound velocity profile, and sonic layer depths in both English and metric units. (These parameters may also have been written by GENRAYT.) The console input includes sonic layer depth option, maximum range, wave height, bottom province option, specification of the desired frequencies, and specification of the desired source and receiver depths. Also, the operator selects the desired output displays.

Output: The propagation loss values are written out to the intermediate file where the information can be accessed for use by the tactical programs. There is also a program, FACTGRAF:OL, which will display in tabular and graphic form the information stored in the intermediate file without requiring FACT to be executed again.

The operator may choose to output any of the following on the display screen:

1. A table of the FACT input parameters.

2. All the propagation loss tables at 1 kiloyard intervals.

3. The sound velocity profile.

4. The source/receiver pair ray trace graphics for 100- or 200-kiloyard ranges (with a selectable depth scale in water depth < 10,000 ft).

5. All the propagation loss-versus-range graphics with optional decibel range override on one per page graphics.

The sample form on the following page provides easy transfer of the FACT output to end-users.

Classification:	Output displays coupling geographic location with bottom type are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, Naval Security Regulations.
Operator Interface:	Table 9-1 describes the interchange of information between the operator and the CRT/keyboard under normal working conditions.
Execution Time:	45 seconds to 20 minutes, depending on the number of source-receiver pairs and frequencies selected.

ICAPS FACT PROP LOSS

TIME ____________ LAT ____________

PATRL AREA ____________ LONG ____________

FREQ (Hz) ________

FOM	DR	CZ1		CZ2	
RCR	___	SRC	___		
75					
85					
95					
105					
RCR	___	SRC	___		
75					
85					
95					
105					
RCR	___	SRC	___		
75					
85					
95					
105					

FREQ (Hz) ________

FOM	DR	CZ1		CZ2	
RCR	___	SRC	___		
75					
85					
95					
105					
RCR	___	SRC	___		
75					
85					
95					
105					
RCR	___	SRC	___		
75					
85					
95					
105					

FREQ (Hz) ________

FOM	DR	CZ1		CZ2	
RCR	___	SRC	___		
75					
85					
95					
105					
RCR	___	SRC	___		
75					
65					
95					
105					
RCR	___	SRC	___		
75					
85					
95					
105					

FREQ (Hz) ________

FOM	DR	CZ1		CZ2	
RCR	___	SRC	___		
75					
85					
95					
105					
RCR	___	SRC	___		
75					
85					
95					
105					
RCR	___	SRC	___		
75					
85					
95					
105					

TABLE 9-1. FACT PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R FACT	Initiates program FACT.
2	CRT	***FACT (ICAPS)*** USER RUN IDENTIFIER =	An identifying label, maximum of 10 characters, may be entered.
	OPR	Enter label, press RETURN key.	
3	CRT	BOTTOM PROVINCE (FREQ. LESS THAN 1000 Hz) = X DO YOU WISH TO CHANGE? (1 = YES, 0 = NO)	Program displays BP in slot X selected in PROFGEN.
	OPR	Enter 1 or 0 and RETURN.	If 0, processing continues at event #5.
4	CRT	BOTTOM PROVINCE (1, 3, or 4) =	
	OPR	Enter 1, 3, or 4 and RETURN.	1, 3, 4 only acceptable entries
5	CRT	BOTTOM PROVINCE (FREQ. GREATER OR EQUAL TO 1000 Hz) = X DO YOU WISH TO CHANGE? (1 = YES, 0 = NO)	Program displays BP in slot X selected in PROFGEN
	OPR	Enter 1 or 0 and RETURN.	If 0, processing continues at event #7.
6	CRT	BOTTOM PROVINCE (1-9) =	
	OPR	Enter 1-9 and RETURN.	1-9 only acceptable entries.
7	CRT	BOTTOM DEPTH = XXXX FT	Bottom depth appears in slot XXXX (selected or default in PROFGEN).

TABLE 9-1. FACT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
8	CRT	SONIC LAYER DEPTH = XXX FT DO YOU WISH TO CHANGE? (1 = YES, 0 = NO)	SLD selected in PROFGEN appears.
	OPR	Enter 1 or 0 and RETURN.	If 0, processing continues at event #10.
9	CRT	SONIC LAYER DEPTH IN FEET ([illegible] OTTOM) =	Alter SLD as desired, in units of feet.
	OPR	Enter [illegible] feet and RETURN.	
10	CRT	MAXIMUM RANGE IN KILOYARDS (1-200, DEFAULT = 100) =	Enter 0 for default. Entry of a negative value causes the program to use the absolute of that value.
	OPR	Enter maximum range in kiloyards and RETURN.	
11	CRT	WAVE HEIGHT IN FEET (0 - 99) =	
	OPR	Enter wave height and RETURN.	
12	CRT	NUMBER OF FREQUENCIES (1-4) =	Event 13 is repeated 1-4 times, depending on response.
	OPR	Enter number of frequencies to be specified and RETURN.	
13	CRT	FREQUENCY IN HERTZ =	Enter first frequency only; event repeats for additional frequencies.
	OPR	Enter first frequency in hertz and RETURN.	

TABLE 9-1. FACT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
14	CRT	NUMBER OF SOURCE-RECEIVER DEPTH PAIRS (1-3) =	
	OPR	Enter number of S/R depth pairs and RETURN.	
15	CRT	SOURCE DEPTH IN FEET (0-BOTTOM) =	Event #15 is repeated 1-3 times, depending on response in event #14.
		RECEIVER DEPTH IN FEET (0-BOTTOM) =	Upon completion program begins to execute. Depending on number of frequencies and S/R pairs, run time is 45 seconds to 20 minutes.
	OPR	Enter source depth, RETURN, receiver depth, RETURN, for each pair specified in event #14.	
16	CRT	ASRAP NORMAL END	Calculations now complete. Program halts, bell rings. (FACT = Passive ASRAP)
	OPR	Press LF or RETURN to continue.	When display is complete press LF for hard copy or RETURN.
17	CRT	DO YOU WISH TO DISPLAY THE FACT INPUT PARAMETERS? (0 = NO, 1 = YES)	Regardless of input in events 17-20 continue synchronously. Data appear in event #24.
	OPR	Enter 0 or 1 and RETURN.	
18	CRT	DO YOU WISH TO DISPLAY THE PROPAGATION-LOSS VALUES AS CALCULATED IN FACT? (0 = NO, 1 = YES)	
	OPR	Enter 0 or 1 and RETURN.	
19	CRT	DO YOU WISH TO DISPLAY THE SOUND-VELOCITY PROFILE? (0 = NO, 1 = YES)	
	OPR	Enter 0 or 1 and RETURN.	

TABLE 9-1. FACT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
20	CRT OPR	DO YOU WISH TO DISPLAY THE RAYTRACE GRAPHICS? (0 = NO, 1 = YES WITH 0-100 KYD RANGE, 2 = YES WITH 0-200 KYD RANGE) Enter 0, 1, or 2 and RETURN.	If 0, processing continues at event #24. If nonzero and bottom depth > 10000 feet, processing continues at event #24.
21	CRT	BOTTOM DEPTH = XXXXX FT.	Bottom depth appears in slot XXXXX (selected or defaulted in PROFGEN). If bottom depth ≤ 2000, processing continues at event #23.
22	CRT OPR	RAYTRACE DEPTH OPTIONS ARE 10000 OR 20000FT. INPUT 1 FOR 10000 OR 2 FOR 20000: Enter 1 or 2 and RETURN.	Processing continues at event #24.
23	CRT OPR	RAYTRACE DEPTH OPTIONS ARE 2000, 10000, OR 20000 FT. INPUT 1 FOR 2000, 2 FOR 10000, OR 3 FOR 20000: Enter 1, 2, or 3 and RETURN.	
24	CRT OPR	DO YOU WISH TO DISPLAY THE PROPAGATION-LOSS GRAPHICS? (0 = NO, 1 = YES, ONE PER PAGE, 2 = YES, TWO PER PAGE) Enter 0, 1, or 2 and RETURN.	Choice of 0 or 2 forfeits DB override option; processing continues at event #27.
25	CRT OPR	DO YOU WISH TO OVERRIDE 40-120 DB RANGE? (0 = NO, 1 = YES) Enter 0 or 1 and RETURN.	If 0, processing continues at event #27.

TABLE 9-1. FACT PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
26	CRT	INPUT LOWER AND UPPER DB VALUES	Enter lower and upper DB values separated by a comma.
	OPR	Enter number, number and RETURN.	
27	CRT	Graphic or tabular display of requested option.	Desired graphics appear as requested. When bell rings display is complete.
	OPR	Press LF or RETURN to continue.	Press LF for hard copy or RETURN. Event repeats until all selected options have been displayed.
28	CRT	STOP	Program halts. Control returns to XDOS.
NOTE		If interest is for graphics only from the latest run, type:	Processing begins at event #17.
	OPR	R FACTGRAF:OL and RETURN.	

10.0 INTERMEDIATE FILE Z999ICAP:IM (ICAPFILE) CONTENTS DISPLAY

File Name:	ICAPFILE
Function:	Allows operator to view contents of intermediate file Z999ICAP:IM.
Input:	No input necessary, simply initiate the program.
Output:	Parameters entered in PROFGEN or FACT at the latest execution.
Classification:	Output displays coupling geographic location with bottom type are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, Naval Security Regulations.
Operator Interface:	The conversational format and operating sequence in Table 10-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.
Execution Time:	Immediate.

TABLE 10-1. ICAPFILE PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R ICAPFILE Enter and press RETURN.	Initiates ICAPFILE program.
2	CRT	INTERMEDIATE FILE Z999ICAP:IM	Displays input parameters of latest execution of PROFGEN and FACT. Nothing displayed if not previously run.
	OPR	Press RETURN.	When display is complete press LF for hard copy or RETURN.
3	CRT	STOP	

11.0 COMPACTED ASRAP (ASRAPC) MODEL

Program execution events are described in Table 11-1.

File Name: ASRAPC

Function: ASRAPC is a data format program that condenses propagation loss data into a brief message for easy transmission and eliminates the need for the user to graphically manipulate or interpret propagation loss data in order to obtain tactically useful information. The program computes Median Detection Ranges (MDR) to the nearest one-half nautical mile. Also computed are 50 percent probability of detection ranges for Convergence Zone (CZ) and/or bottom bounce if these modes exist for a particular Figure of Merit (FOM).

Input: ASRAPC reads propagation loss data from the intermediate file Z999ICAP:IM. The operator selects the FOM or FOM range and the source/receiver depth combination for desired ASRAPC predictions via operator console.

Output: Z999ICAP:IM, remains unaltered. The output includes a summary heading of latitude, longitude, source/receiver depth, and frequency selected from FACT, as well as a tabular listing of data. The data is displayed in columns labeled FOM (for Figure of Merit), M (for Median Detection Range), B (for Bottom Bounce) and C (for Convergence Zone). For Bottom Bounce mode, the program displays the range of the first Bottom Bounce occurrence where there is at least 50% probability of detection, and the width of the area where the probability of detection by Bottom Bounce is 50% or greater. For Convergence Zone mode, ASRAPC displays CZ interval range, width of first CZ, and the number of CZs for each FOM, with the values separated by slashes (/). Blanks under either the "B" or "C" columns indicate that there is less than a 50% POD for the FOM.

Under most circumstances ASRAPC will display actual detection range data, in nautical miles (NM), for Median Detection Range, Convergence Zone, and Bottom Bounce signals. However, under some circumstances other data symbology (e.g. LESS, GRTR, "*," and "-") may appear. A brief explanation of each of these symbols follows:

LESS - The MDR was less than .5 NM for that particular FOM.

GRTR - The MDR was greater than 125 NM.

"*" -- The range has exceeded the maximum dimension allotted in the format.

"-" --This indicates that due to overlapping of signal arrival paths certain data parameters are impossible to determine even though that particular arrival pathway does indeed exist.

Operator
Interface: The conversational format and operating sequence in Table 11-1 describe the interchange of information between the operator and CRT/keyboard under normal conditions.

Execution Time: Immediate.

TABLE 11-1. ASRAPC PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R ASRAPC	Initiates ASRAPC program.
2	CRT OPR	Select FOM Range 0 - Default (60-88, increment = 2) 1 - To select a single FOM 2 - To input FOM window Enter 0, 1, or 2 and RETURN.	Program displays FOM options. If response is: 0, program continues at event #6. 1, program continues at event #3 2, program continues at event #4.
3	CRT OPR	INPUT FOM: Enter FOM and RETURN.	 Program continues at event #6.
4	CRT OPR	INPUT LOW AND HIGH FOM: Enter number, number and RETURN.	Enter low and high FOM values separated by a comma.
5	CRT OPR	INCREMENT = Enters increment and RETURN.	Programs continues at event #6.
6	CRT OPR	SELECT A SOURCE/RECEIVER PAIR (Displays source/receiver combinations available in the intermediate file) Enter index of desired source/receiver pair.	This event is ignored if there is only one source/receiver pair available in the intermediate file.
7	CRT OPR	ASRAPC FOR (latitude, longitude) (ASRAPC output data) Press RETURN.	Program displays tabulated listing of ASRAPC output. When display is complete, bell rings. Press LF for hard copy or RETURN.
8	CRT	STOP	Program is complete.

12.0 LATERAL RANGE (LATRAN) MODEL

Program execution events are described in Table 12-1.

File Name: LATRAN

Function: The LATRAN model computes passive lateral range curves that indicate probability of detection (POD) versus range. The FACT propagation loss values stored in the intermediate file are used by LATRAN to produce lateral range curves for any of the frequency and source/receiver depth combinations treated in FACT. LATRAN computes the lateral range curves by solving the passive sonar equation. The model assumes a sensor with no directivity.

The Figure of Merit (FOM) with the accompanying standard deviation (sigma) is superimposed on the propagation loss curve in order to develop the lateral range values. By definition, the range(s) at which the propagation loss equals the FOM always have a 50% probability of detection. The FOM sigma determines how far the probabilities of the ranges with propagation loss less than or greater than the FOM will deviate from the 50% probability line.

Input: LATRAN reads the intermediate file Z999ICAP:IM to obtain all the FACT input parameters (i.e., wave height, sonic layer, bottom province, frequencies, maximum range, source-receiver pairs) and propagation loss output values. The operator selects the source-receiver pairs and individual frequencies for which he desires lateral range curves. For each frequency, the user must input values for the required lateral range parameters (i.e., standard deviation of the FOM, source level, ambient noise, and recognition differential).

Output: Z999ICAP:IM remains unaltered. The desired lateral range curve graphics (probability of detection versus range) appear in a two-graph-per-page format on the CRT screen.

Classification: Output displays coupling geographic location with either bottom type or scattering coefficients are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, Naval Security Regulations.

Operator Interface: The conversational format and operating sequence in Table 12-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: 10 to 30 seconds.

TABLE 12-1. LATRAN PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R LATRAN	Initiate program LATRAN.
2	CRT	FACT INPUT PARAMETERS	Displays table of data input to FACT: date, position, number of BT points, units, number of SVP points, number of range points, SLD, and wave height.
	OPR	Press RETURN.	When display is complete press LF for hardcopy or RETURN.
3	CRT	INPUT LATERAL-RANGE CURVE PARAMETERS Requests: HOW MANY SOURCE-RECEIVER PAIRS DO YOU WANT TO SELECT ?	Displays frequency/bottom type and source/receiver depth pairs for which FACT computed prop-loss data.
	OPR	Enter number and press RETURN.	Number of S/R pairs selected may not exceed the number of pairs displayed.
4	CRT	SOURCE-RECEIVER DEPTH PAIR INDEX NUMBER =	Index number is selected from those displayed in event #3.
	OPR	Enter index number and press RETURN.	Events 4 through 10 are repeated until the number of S/R pairs selected in event #3 is satisfied.
5	CRT	HOW MANY FREQUENCIES DO YOU WANT TO SELECT FOR THIS DEPTH?	
	OPR	Enter number and press RETURN.	Number of frequencies may not exceed the number displayed in event #3.

TABLE 12-1. LATRAN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
6	CRT	SELECT FREQUENCY-BOTTOM TYPE PAIR INDEX NUMBER =	Index number is selected from those displayed in event #3.
	OPR	Enter index number and press RETURN.	Events 6 through 10 are repeated until the number of frequencies selected in event #5 is satisfied.
7	CRT	STANDARD DEVIATION (SIGMA) OF THE FOM (DEFAULT = 8) =	If ambient noise target type & speed are known enter 6 db. If ambient noise estimated & there is knowledge of target type or speed enter 8 db. If ambient noise is estimated and target type & speed unknown enter 10 db. If default desired enter 0.
	OPR	Enter sigma value and press RETURN.	
8	CRT	SOURCE LEVEL IN DB (DEFAULT = 150) =	Target source level for each frequency. If default desired enter 0.
	OPR	Enter source level and press RETURN.	
9	CRT	AMBIENT NOISE IN DB (DEFAULT = 80) =	The composite of all noises that exist in the ocean environment with the exception of self-noise and reverberation. If default desired enter 0.
	OPR	Enter ambient noise and press RETURN.	
10	CRT	RECOGNITION DIFFERENTIAL IN DB (DEFAULT = 0) =	Defined in relation to a 50% probability of detection by which the acoustic signal exceeds the background noise. If default desired enter 0.
	OPR	Enter recognition differential and press RETURN.	

TABLE 12-1. LATRAN PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
11	CRT	LATERAL-RANGE CURVE GRAPHICS	Program displays lateral-range curve graphs, 2 per page, for each frequency per source/receiver depth pair. As pages are completed 'BELL' rings, program pauses. When display is complete bell rings, press LF for hard copy or RETURN.
	OPR	Press RETURN.	Event repeats until all graphics are displayed.
12	CRT	END OF PROGRAM LATRAN	Program is completed. Control is returned to the XDOS monitor.

13.0 SHIP HELICOPTER ACOUSTIC RANGE PREDICTION SYSTEM (SHARPS) MODEL

Program execution events are described in Table 13-1.

File Name:	SHRPS
Function:	SHARPS is an active propagation loss program for a single profile, flat-bottom environment. The program computes 50 percent probability of detection ranges for in-layer and below-layer targets for SQS-39, -41, SQS-23, SQQ-23, SQS-26 (steel and rubber), SQS-35 (VDS), and AQS-13 sonars operating in active mode. Additionally, passive in-layer and below-layer range predictions are made for the SQQ-23 and SQS-26 sonars, while passive below-layer detection ranges are predicted for the SQS-35 and AQS-13 sonars. Also computed are optimum dip depth for the AQS-13 and optimum tow depth for the SQS-35, counterdetection ranges for all sonars, required bottom depth for convergence zone (CZ) transmission, the CZ range when that mode exists, and depression angle and ranges for SQS-26 sonars when bottom bounce mode is possible.
Input:	The SHARPS program reads the intermediate file Z999ICAP:IM. Console input includes wave height, bottom type, scattering coefficients, and wind speed.
Output:	The output identifies the operational detection capabilities of the various sonars as specified above.
Classification:	Output displays detailing operational capabilities of specific sonars are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, Naval Security Regulations.
Operator Interface:	The conversational format and operating sequence in Table 13-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.
Execution Time:	30 minutes.

TABLE 13-1. SHARPS PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R SHRPS	SHARPS program initiates.
2	CRT	WAVE HEIGHT (FT) = BOTTOM TYPE (1-9) = SCATTERING COEFFICIENTS ALL SONARS VOLUME (EXC. SQS-26) = ALL SONARS LAYER (EXC. SQS-26) = SQS-26 VOLUME = SQS-26 LAYER = WIND SPEED (KTS) =	After each "=" sign, operator enters value and then presses RETURN key. Enter 0 and RETURN to effect default. Use high frequency bottom types only. Scattering coefficients are available in classified appendices. Layer values are obtained by adding -10 dB to volume coefficient.
	OPR	Enter each value and RETURN.	
3	CRT	SHIP-HELICOPTER RANGE PREDICTION (SHARPS output data)	Displays of tabulated listings of SHARPS output (two pages). Parameter definitions are listed on second page of output listing.
	OPR	Press LF for hard copy or RETURN.	
4	CRT	END OF SHARPS RUN STOP	Control returns to program monitor.
	OPR	To view output again type: R SHRPSEG4:OL	

NOTE ON VERSION II.5 OF SHARPS. REMOVE THIS PAGE UPON IMPLEMENTATION OF SHARPS III.

The SHARPS program is designed to be run on a CDC computer with a 60-bit floating-point word structure. Conversion to a NOVA computer with a 32-bit floating-point structure decreased the potential range of values resulting from arithmetic calculations. The operating system for ICAPS reports any arithmetic calculations resulting in a value outside the maximum range as a run error. This differs from other computers which only set an internal status word before continuing execution. The messages appearing on the CRT indicate computer limitations and not necessarily program errors. It is recommended that the screen be cleared each time the full page indicator illuminates. This allows the program to continue execution and eventually report the resulting forecast, accurate within the limitations of the program.

14.0 ACTIVE ACOUSTICAL SENSOR RANGE PREDICTION (ACTIVE ASRAP) MODEL

Program execution events are described in Table 14-1.

File Name: ACTIVE

Function: ACTIVE ASRAP provides range predictions for the SSQ-47 and SSQ-50 active sonobuoys. ACTIVE range predictions are based on a single-ping 50% probability of detection using the AMOS equations for two-way transmission loss. Equipment parameters for each buoy are built into the model and the receiver depths are provided by the program. ACTIVE ASRAP provides range predictions for the target/receiver depth combinations: shallow/shallow; deep/shallow; shallow/deep; and deep/deep. The shallow and deep receiver depths are fixed according to the standard sonobuoy settings. The shallow target depth is also fixed by the program at 60 feet. The deep target depth is set according to the sonic layer depth (SLD). If the SLD is at the surface, the target is fixed at 100 feet. When the SLD is not at the surface, the target depth is set at a depth defined by $30\sqrt{SLD}$. The SSQ-47 sonobuoy has twelve paired channels corresponding to six frequencies. The SSQ-50 sonobuoy has four operating channels (A, B, C, D) which correspond to four set frequencies. The SSQ-50 can also be operated in three continuous wave (CW) modes, each with a different signal duration and one frequency modulated (FM) mode.

Input: The program reads the sound velocity profile from the intermediate file Z999ICAP:IM. Console input consists of wave height, target strength, recognition differential, and a flag set at 1 if prop loss information is desired, and 0 if not.

Output: The program produces tables of detection ranges in kiloyards for SSQ47 (one mode, six frequencies) and SSQ50 (four modes, four frequencies) for target/receiver depth cases shallow/shallow, deep/shallow, shallow/deep, and deep/deep.

Classification: Output displays detailing operational capabilities of specific sonobuoys are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, Naval Security Regulations.

Operator Interface: The conversational format and operating sequence in Table 14-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: 2 minutes.

TABLE 14-1. ACTIVE PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R ACTIVE	Initiates ACTIVE ASRAP program.
2	CRT	ACTIVE ASRAP WAVE HEIGHT (FT) = ?	
	OPR	Enter wave height and press RETURN.	
3	CRT	DO YOU WANT TO CHANGE TARGET STRENGTH (1 FOR YES, 0 FOR NO)?	
	OPR	Enter 1 or 0.	If NO, processing continues at event #6.
4	CRT	INPUT TS IN DB FOR SSQ47 (0 FOR DEFAULT).	
	OPR	Enter target strength, or 0 if default value is to be used.	
5	CRT	INPUT TS IN DB FOR SSQ50, MODE X (0 FOR DEFAULT)	Action occurs once for each mode x, $1 \leq x \leq 4$.
	OPR	Enter target strength, or 0 if default value is to be used	
6	CRT	DO YOU WANT TO CHANGE RECOGNITION DIFFERENTIAL (1 FOR YES, 0 FOR NO)?	
	OPR	Enter 1 or 0	If NO, processing continues at event #8.

TABLE 14-1. ACTIVE PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
7	CRT	(Requests similar to those in events #5 and #6 are made for input of recognition differential.)	
	OPR	Enter recognition differential as requested.	
8	CRT	DO YOU WANT TO SEE PROP LOSS? (1 = YES, 0 = NO)	If NO, processing continues at event #10.
	OPR	Enter 1 or 0 and RETURN.	Program halts, bell rings, Press LF if hard copy desired. (This procedure continues for each of the following displays.)
9	CRT	ONE-WAY TRANSMISSION LOSS	Displays of 1-way transmission loss vs. range for the 6 frequencies of SSQ-47. There are 4 tables (2 pages each) in the order shallow/shallow, deep/shallow, shallow/deep, and deep/deep.
	OPR	Press LF if hard copy desired or RETURN.	
10	CRT	SSQ-47	Display of 50% probability of detection values for each target/receiver depth pair and each of the 6 frequencies.
	OPR	Press LF if hard copy desired or RETURN.	If NO in event #8, processing continues at event #12.

TABLE 14-1. ACTIVE PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
11	CRT	ONE-WAY TRANSMISSION LOSS	Displays of 1-way transmission loss vs. range for the 4 frequencies of SSQ50. There are 4 tables (2 pages each) in the order shallow/shallow, deep/shallow, shallow/deep, and deep/deep.
	OPR	Press LF if hard copy desired or RETURN.	
12	CRT	SSQ 50	Display of 50% probability of detection values for each target/receiver depth pair and each of the 4 frequencies for each of the 4 modes.
	OPR	Press LF if hard copy desired or RETURN.	
13	CRT	(Parameters for TS, RD, and wave height are displayed.)	
	OPR	Press LF or RETURN.	
14	CRT	STOP	

15.0 AUTOMATED DETECTION PREDICTION (ADEP) MODEL

Program execution steps are described in Table 15-1.

File Name: ADEP

Function: The ADEP model computes passive sonobuoy pattern detection probabilities for any of twelve area search and barrier patterns defined by the model. The ADEP model makes certain assumptions and generalizations in order to minimize computer processing times, and therefore is only a general guide to sonobuoy pattern assessment. Rectangular patterns of 8, 16, 24, and 32 sonobuoys each arranged in 2, 3, or 4 rows are available in the ADEP model.

In preparation for evaluating the performance of the selected sonobuoy pattern, ADEP develops a lateral range solution. The operator supplies values for all the parameters in the passive sonar equation except propagation loss. The resulting lateral range curve is similar to that produced by LATRAN, but is displayed together with the corresponding propagation loss curve from FACT.

The area search model assumes the target submarine to be within the area of coverage provided by the sonobuoy field. ADEP evaluates the probability within a sample subarea assumed to be near the middle of the sonobuoy pattern. This represents the smallest subarea containing a repeating probability surface. The average probability for the subarea is computed and that probability is applied to the other subareas. ADEP then computes the cumulative probability versus time.

The barrier model assumes the target submarine is on a straight line track perpendicular to the single or double line barrier. The model assumes the detection probability to be a mirror image as the submarine approaches and leaves the barrier pattern. The barrier instantaneous probability of detection (POD) versus time is the instanteous percentage probability over time. Mathematically, it is defined as a product of probability of detection at a given range and the probability that the target is at that range. The model uses the submarine range and speed to determine the time factor. The range standard deviation is applied to a normal probability curve to determine the probability that the target is at the specified range.

Input: The ADEP program reads the intermediate file Z999ICAP:IM for propagation loss information. Console input includes the selection of a propagation loss table (calculated in FACT) along with the specification of source level, ambient noise, recognition differential, monitor cycle degradation, pattern selection, pattern geometry definition, standard deviation of the Figure of Merit (sigma FOM), submarine speed, submarine range, and submarine range standard de-

viation (range sigma). The monitor cycle is the fraction of the total number of sonobuoys employed that can be monitored by the aircraft at any one time. The user selects search patterns from Table 15-2.

Output: Output from the area search model includes a buoy geometry diagram, the average probability of detection, and the cumulative probability versus time graphic display. Output from the barrier model is in the form of a barrier line efficiency versus range graphic which is the percentage probability of detection versus range for the barrier sonobuoy pattern.

Classification: Output displays coupling geographic location with bottom type are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, Naval Security Regulations.

Operator Interface: The conversational format and operating sequence in Table 15-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: 10 seconds.

TABLE 15-1. ADEP PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R ADEP	Initiate program ADEP.
2	CRT	ICAPS PASSIVE SONOBUOY DETECTION PREDICTION (ADEPS) SELECT PROPAGATION LOSS TABLE CALCULATED FOR FREQUENCY/BOTTOM TYPE PAIR =	Displays summary of frequency/bottom type and source/receiver depth pairs used in the previous FACT run.
	OPR	Enter line number and press RETURN.	Line number is selected from frequency/bottom type pair list displayed.
3	CRT	SOURCE/RECEIVER DEPTH PAIR =	
	OPR	Enter line number and press RETURN.	Line number is selected from source/receiver depth pair list displayed.
4	CRT	INPUT LATERAL RANGE PARAMETERS STANDARD DEVIATION (SIGMA) OF THE FOM (DEFAULT = 8) = SOURCE LEVEL IN DB (DEFAULT = 150) = AMBIENT NOISE IN DB (DEFAULT = 80) = RECOGNITION DIFFERENTIAL IN DB (DEFAULT = 0) =	Entering 0 will result in default values being selected. Accuracy of program results depends on these values. Operator is strongly encouraged to avoid default values in favor of values representative of his particular situation.
	OPR	Enter appropriate value and press RETURN for each item.	When display is complete bell rings, press LF for hard copy or RETURN.

TABLE 15-1. ADEP PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
5	CRT	PROPAGATION LOSS/PROBABILITY OF DETECTION VERSUS RANGE (PASSIVE)	Displays prop loss and lateral range curve graphics for single, omnidirectional receiver.
	OPR		When bell rings, press LF for hard copy or RETURN.
6	CRT	MODEL (1 = AREA SEARCH, 2 = BARRIER SEARCH, 3 = NEW LATERAL RANGE CURVE, 4 = NEW PROPAGATION LOSS, 5 = END OF RUN) =	If response = : 1, program continues at event #7; 2, program continues at event #10; 3, program continues at event #4; 4, program continues at event #2; 5, program continues at event #13.
	OPR	Enter option number and press RETURN.	
7	CRT	INPUT AREA SEARCH MODEL PARAMETERS PATTERN =	Pattern number is found in Table 11-2.
	OPR	Enter pattern number and press RETURN.	XX and YY indicate number of buoys and rows, respectively, corresponding to pattern selected.
	CRT	XX BUOYS YY ROWS	
8	CRT	MONITOR CYCLE (1 = ALL, 2 = 3/4, 3 = 2/3, 4 = 1/2, 5 = 1/3, 6 = 1/4) = AREA WIDTH (NM) = AREA LENGTH (NM) = SUBMARINE SPEED (KNOTS) =	Monitor cycle is the fraction of the total number of sonobuoys employed that can be monitored by the aircraft at any one time. Area width determines row spacing. Area length determines lateral (buoy-buoy) spacing.
	OPR	Enter appropriate value and press RETURN for each item.	

TABLE 15-1. ADEP PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
9	CRT	***AREA SEARCH MODEL***	Displays area search model input parameters and cumulative probability of detection graphic. When bell rings press LF for hard copy or RETURN.
	OPR	Press RETURN.	Program continues at event #6.
10	CRT	INPUT BARRIER SEARCH MODEL PARAMETERS PATTERN (1, 4, 7, 10) =	Pattern number is found in Table 15-2.
	OPR	Enter pattern number and press RETURN.	XX and YY indicate number of buoys and rows, respectively, corresponding to pattern selected.
	CRT	XX BUOYS YY ROWS	
11	CRT	MONITOR CYCLE (1 = ALL, 2 = 3/4, 3 = 2/3, 4 = 1/2, 5 = 1/3, 6 = 1/4) = AREA WIDTH (NM) = AREA LENGTH (NM) = SUBMARINE SPEED (KNOTS) = SUBMARINE RANGE FROM BARRIER (NM) = STANDARD DEVIATION OF SUBMARINE RANGE (NM) =	Monitor cycle is the fraction of the total number of sonobuoys employed that can be monitored by the aircraft at any one time. Area width determines row spacing. Area length determines lateral (buoy-buoy) spacing.
	OPR	Enter appropriate value and press RETURN for each item.	
12	CRT	***BARRIER SEARCH MODEL***	[illegible] barrier search model [illegible] parameters and graphics of line efficiency and probability of detection versus time.
	OPR	Press RETURN.	When bell rings press LF for hard copy or RETURN. Program continues at event #6.
13	CRT	END OF ADEP RUN STOP	

TABLE 15-2. AREA SEARCH PATTERNS

Pattern No.	No. of Buoys	No. of Rows
*1	8	2
2	8	3
3	8	4
*4	16	2
5	16	3
6	16	4
*7	24	2
8	24	3
9	24	4
*10	32	2
11	32	3
12	32	4

*Also available for Barrier Search.

16.0 TACTICAL ASW SONAR DECISION AID (TASDA) PACKAGE

The TASDA package was designed to aid in real-time tactical decision-making by predicting the performance and detection capabilities of passive sonobuoy patterns.

TASDA uses a Monte Carlo technique to predict and compare passive sonobuoy field detection capabilities for current environmental conditions and various sonobuoy patterns and spacings for a target passing through or about the field. The TASDA package uses the program GEOMT to create a sonobuoy tactics file, while the TASDA program addresses the target threat definition, simulation, and analysis.

GEOMT allows the user-definition of up to 20 sonobuoy patterns using coordinate points and spatial dimensions. Each pattern is defined by the number of buoys, and whether it is applicable against conventional or nuclear, transiting or holding targets.

In TASDA the target characteristics are defined by nuclear/conventional, holding/transiting, bearing, snorkel/submerged time, and target operating area. The aircraft is characterized by the time required to reach the station and its sonobuoy monitoring range. Propagation loss is entered from the keyboard, automatically read from pre-stored values, or in most cases read from the FACT output in the intermediate file. Figure of Merit is defined by the user. Hydrophone depth schedules can also be assigned for any of the sonobuoy patterns defined in GEOMT. TASDA can evaluate any of the GEOMT patterns selected by the operator, or the program can select the best pattern(s) by matching the pattern definition to the target definition.

To evaluate the sonobuoy effectiveness TASDA uses: 1) probabilities of single and multiple sonobuoy detections; 2) mean single and multiple sonobuoy holding times; 3) mean time to first detection (MTFD). Output includes a listing of the input parameters, probability of detection versus time at each FOM and buoy spacing specified, and a mean time to first detection at each FOM defined. A diagram of the sonobuoy field configuration is also displayed.

TASDA and GEOMT are both very flexible programs allowing data files to be built once and updated later to make changes. Safeguards are built into the programs to prevent accidental deletion of the files. The TASDA execution can be stopped at any point and later restarted to allow use of the NOVA for other tasks.

16.1 GEOMETRY TACTICS (GEOMT) PROGRAM

Program execution events are described in Table 16-1.

File Name:	GEOMT
Function:	Collects the geometric information describing selected sonobuoy patterns and creates a geometry tactics file.
Input:	Console input includes tactic identification label, target application, number of buoys in pattern, buoy position assignment (based on Sonobuoy Position Planner Chart) and, optionally, user-defined buoy coordinates, buoy-to-buoy distance calculations, and buoy spacing limits. Only parameters that are pertinent to the data set being defined are requested in the conversational mode. The program facilitates corrections to the input data via repetitive cycling through the data input mode. Up to 20 tactics may be defined. A listing of GEOMT input parameters is presented on the following page.
Output:	GEOMT creates a Geometry Tactics File containing N tactics ready for analysis by the TASDA program.
Option List:	The GEOMT data input module list provides the operator with the capability to create, modify, and/or examine the contents of a data input file which resides on the disk. Repetitive cycling through the module permits processing of as many areas of the file as needed, as many times as needed, until the file is satisfactory. It should be understood that all modifications, deletions, and additions that the user may make are performed in memory. The disk-resident data file (which is read by the main body of the program) is not altered until the user explicitly instructs that updates made in memory be written back onto the disk. Consequently, any unwanted changes or accidental deletions may be corrected by terminating the run and starting over with the original data input file. Once a parameter, or set of parameters, is incorporated into the disk-resident data input file, it remains there until it is changed, deleted, or the file is re-initialized. Therefore, parameters that remain the same from run to run do not have to be entered for each execution. The ASW scenario defined by the operator determines the number and characteristics of the parameters necessary for a particular execution. In all cases, data that exist on the disk-resident file, but are inapplicable for the current run, remain unused by the program.
Operator Interface:	The conversational format and operating sequence in Table 16-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions. Copies of the Sonobuoy Position Planner Chart (SPPC) are provided for tactics constructed (See SPPC sample).

Execution Time: 3 minutes.

GEOMT Input Parameters: The GEOMT data input file (GEOMTIP:IM) is segmented into individual tactics. A maximum of 20 tactics may exist in the file at one time. The following is a list of parameters that may be required by the GEOMT Data Input Module to define a single tactic:

TACTIC IDENTIFICATION LABEL
TARGET APPLICATION SELECTION
- conventional holding target
- conventional transiting target
- nuclear holding target
- nuclear transiting target

BUOY COORDINATES DEFINITION FLAG
NUMBER OF BUOYS
NUMBER OF BUOY-TO-BUOY DISTANCE CALCULATIONS
BUOY SPACING LIMITS
- minimum spacing
- maximum spacing

BUOY POSITION ASSIGNMENTS
SPECIFIC BUOY COORDINATES (if COORDINATES DEFINITION FLAG = 1)
BUOY PATTERN SCHEMATIC ANOMALY EXPLANATION (if COORDINATES DEFINITION = 1)
BUOY-TO-BUOY DISTANCE CALCULATIONS REQUESTS (if NUMBER OF DISTANCE CALCULATIONS GT 0)

TABLE 16-1. GEOMT PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	Enter R GEOMT and RETURN.	Initiates program GEOMT.
2	CRT	***GEOMT DATA INPUT MODULE OPTION LIST*** OPTION 0: LIST EXISTING TACTICS FILE (GEOMT:IM) OPTION 1: EXECUTE MAIN SEGMENT OF GEOMT OPTION 2: MODIFY DATA INPUT FILE (GEOMTIP:IM) OPTION 3: LIST EXISTING DATA INPUT FILE (GEOMTIP:IM) OPTION 4: INITIALIZE DATA INPUT FILE OPTION 5: INCORPORATE NEW UPDATES INTO PERMANENT DATA INPUT FILE OPTION 6: TERMINATE THIS RUN OPTION 7: GET EXPANDED EXPLANATION OF ABOVE OPTIONS ENTER 0, 1, 2, 3, 4, 5, 6, OR 7:	If response to event #2: = 0, program continues at event #4 = 1, program continues at event #101 = 2, program continues at event #12 = 3, program continues at event #6 = 4, program continues at event #3 = 5, program continues at event #100 = 6, program continues at event #5 = 7, program continues at event #111
	OPR	Enter number (0-7) and RETURN.	
3		(A data input file is being defined for the first time. If such a file already exists, a warning message is displayed.)	A data input file need only be created once. Any changes can be made via Options 2, 3, and 5. Selecting Option 4 would erase all of the current data input file. The warning message is a safeguard against accidentally keying in Option 4.
	CRT	***A VALID GEOMT DATA INPUT FILE EXISTS** ***PLEASE CONFIRM THAT YOU WANT TO RE-INITIALIZE THE FILE*** ***ENTER 0 TO CANCEL RE-INITIALIZATION*** ***OR ENTER 1 TO CONFIRM RE-INITIALIZATION*** (ENTER 0 OR 1):	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
	OPR	Enter 0 or 1 and RETURN.	If response is 0 (CANCEL) processing continues at event #2.
3A	CRT	File GEOMTIP:IM has been initialized and is ready to accept input data.	Program will request data to define (add) at least one tactic via CRT/Operator interface. Process follows event sequence similar to 14-17 and 28-59.
	OPR	Enter RETURN.	
4	CRT	***GEOMETRY TAPE CONTENTS*** (Program now displays contents of the existing tactics file, page by page)	Both tabular and graphics display of tactic(s) in GEOMT:IM.
	OPR		If hard copy desired, press LINE FEED; otherwise RETURN.
5	CRT	***END OF RUN*** STOP	Program ends; control returns to XDOS.
6	CRT	DATA INPUT FILE NAME IS: XXXXXXX	
7	CRT	THE FILE CONTAINS n TACTICS: (list of tactic identifiers)	
8	CRT	DO YOU WISH TO SEE A TACTIC? (0-NO, 1-YES)	If response is 0 (NO), processing continues at event #2
	OPR	Enter 0 or 1 and RETURN.	
9	CRT	ENTER THE NUMBER OF A TACTIC TO SEE. (-1 = SUPPRESS SEE, 0 = ALL):	If response is -1 (SUPPRESS) processing continues at event #8.
	OPR	Enter appropriate number and RETURN.	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
10	CRT	(Program now displays the entire contents of any or all tactics contained in the existing data input file, GEOMTIP:IM)	All parameter values, including default values, or "no values stored" message are displayed for each tactic selected.
	OPR		If hard copy is desired, press LF. To continue, press RETURN.
11	CRT	END OF TACTIC n. HIT RETURN TO CONTINUE	If response is 0 (ALL) in event #9, processing continues at event #10 until all tactics are displayed; otherwise processing continues at event #6.
	OPR	Enter RETURN.	
12	CRT	DATA INPUT FILE NAME IS: xxxxxxxx	
13	CRT	DO YOU WISH TO CHANGE? (0 NO, 1 YES):	If response is 0 (NO), processing continues at event #15.
	OPR	Enter 0 or 1 and RETURN.	
14	CRT	ENTER FILE NAME (MAX 59 CHARACTERS):	Processing continues at event #12.
	OPR	Enter name and RETURN.	
15	CRT	EXTENDED TACTICS OUTPUT SUMMARY FLAG (0 NORMAL O/P, 1 EXTENDED O/P):	Choice of 1 produces display similar to option 0 and 3 from event #2. Choice of 0 produces displays similar to option 0 in event #2.
	OPR	Enter 0 or 1 and RETURN.	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
16	CRT	DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	
	OPR	Enter 0 or 1 and RETURN.	If response is 0 (NO), processing continues at event #18.
17	CRT	ENTER EXTENDED TACTICS OUTPUT SUMMARY FLAG (0 = NORMAL O/P, 1 = EXTENDED O/P):	Processing continues at event #15.
	OPR	Enter 0 or 1 and RETURN.	
18	CRT	DATA INPUT FILE NAME IS: XXXXXXXX	
19	CRT	THE EXISTING DATA FILE CONTAINS n TACTICS: (list of tactics follows)	
20	CRT	DO YOU WISH TO DELETE ANY? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues at event #26.
	OPR	Enter 0 or 1 and RETURN.	
21	CRT	HOW MANY DO YOU WISH TO DELETE?:	
	OPR	Enter appropriate number and RETURN.	
22	CRT	PROGRAM WILL MAKE NO DELETIONS UNTIL THE FOLLOWING INPUT IS COMPLETED AND VERIFIED	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
23	CRT	ENTER TACTIC NUMBER TO BE DELETED (ENTER 0 TO SUPPRESS DELE-TION):	If response is 0 (SUPPRESS), processing continues at event #18; otherwise event #23 is repeated, based on number entered in event #21.
	OPR	Enter appropriate number and RETURN.	
24	CRT	HAVE YOU MADE A MISTAKE? (0 NO, 1 YES):	If response is 1 (YES), processing continues at event #18.
	OPR	Enter 0 or 1 and RETURN.	
25	CRT	TACTIC NUMBER k HAS BEEN DELETED.	Processing continues at event #18, with n-1 tactics listed.
26	CRT	DATA INPUT FILE NAME IS: XXXXXXX	
27	CRT	DATA INPUT FILE CONTAINS n TACTICS: (list of tactics follows)	
28	CRT	DO YOU WISH TO ADD ANOTHER TACTIC? (0 NO, 1 YES):	If response is 0 (NO), processing continues at event #60.
	OPR	Enter 0 or 1 and RETURN.	
29	CRT	TACTIC IDENTIFIER (MAX 15 CHAR):	
	OPR	Enter appropriate name and RETURN.	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
30	CRT	TARGET APPLICATION SELECTION: CONVENTIONAL HOLDING TARGET (0 = NOT APPLICABLE, 1 = APPLICABLE): CONVENTIONAL TRANSITING TARGET (0 = NOT APPLICABLE, 1 = APPLICABLE): NUCLEAR HOLDING TARGET (0 = NOT APPLICABLE, 1 = APPLICABLE): NUCLEAR TRANSITING TARGET (0 = NOT APPLICABLE, 1 = APPLICABLE):	
	OPR	Enter 0 or 1 and RETURN after each cue.	
31	CRT	BUOY COORDINATE DEFINITION FLAG (0 = USER NOT TO DEFINE COORDINATES, 1 = USER DEFINE COORDINATES):	
	OPR	Enter 0 or 1 and RETURN.	
32	CRT	NUMBER OF BUOYS IN PATTERN (2 to 64):	Minimum of 2, maximum of 64 buoys per tactic.
	OPR	Enter appropriate value and RETURN.	
33	CRT	NUMBER OF BUOY-TO-BUOY DISTANCE CALCULATIONS (0 = NO CALCULATIONS, MAX = 64):	
	OPR	Enter appropriate value and RETURN.	
34	CRT	MINIMUM BUOY 1 - BUOY 2 SPACING (NM) (0 = PROGRAM DEFAULT VALUE OF 10.):	
	OPR	Enter appropriate value and RETURN.	

TABLE 16-1 GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
35	CRT	MAXIMUM BUOY 1 - BUOY 2 SPACING (NM) (0 PROGRAM DEFAULT VALUE OF 40.):	
	OPR	Enter appropriate value and RETURN.	
36	CRT	BUOY POSITION ASSIGNMENT (FROM SONOBUOY POSITION PLANNER CHART): BUOY 1 CATALOG # ______ BUOY 2 CATALOG # ______ (etc.)	Enter as many catalog numbers and RETURN's as buoys selected in event #32.
	OPR	Enter appropriate catalog numbers from SPPC and RETURN.	
37	CRT	BUOY POSITION ASSIGNMENT (FROM SONOBUOY POSITION PLANNER CHART): BUOY 1 CATALOG # ______ (etc.)	This is simply a summary table of inputs.
	OPR	Enter RETURN.	
38	CRT	DO YOU WISH TO CHANGE ANY VALUES? (0 = NO, 1 = YES)	If response is 0 (NO) and event #31 = 1, processing continues at event #42; if NO and event #31 = 0, and event #33 = 0, processing continues at event #51. If events 38, 31,33 = 0, processing continues at event #59.
	OPR	Enter 0 or 1 and RETURN.	
	OPR	Enter 0 or 1 and RETURN.	
39	CRT	HOW MANY VALUES DO YOU WISH TO CHANGE? (IF YOU WISH TO CHANGE THEM ALL, ENTER -1):	
	OPR	Enter appropriate value and RETURN.	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
40	CRT	BUOY NUMBER =	
	OPR	Enter appropriate number and RETURN.	
41	CRT	CATALOG #	Events #40 and #41 are repeated, based on the value entered in event #39. Processing then continues at event #37.
	OPR	Enter appropriate number and RETURN.	
42	CRT	SPECIFIC BUOY COORDINATES (RANGE = -1000 TO 1000)	Processed only if event #31 = 1.
43	CRT	ENTER n COORDINATE PAIRS BUOY 1: X COORDINATE ____ BUOY 1: Y COORDINATE ____ (etc.)	Enter n (X, Y) coordinate pairs where n is the number of buoys in the tactic. Must be integer numbers.
	OPR	Enter appropriate values and RETURN.	
44	CRT	SPECIFIC BUOY COORDINATES (RANGE = -1000 TO 1000) BUOY 1 (____ , ____) (etc.)	This is a summary table of inputs from event #43.
	OPR	Enter RETURN.	
45	CRT	DO YOU WISH TO CHANGE ANY VALUES? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues to event #50.
	OPR	Enter 0 or 1 and RETURN.	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
46	CRT OPR	HOW MANY DO YOU WISH TO CHANGE? (IF YOU WISH TO CHANGE THEM ALL, ENTER -1): Enter appropriate value and RETURN.	
47	CRT OPR	BUOY # Enter appropriate number and RETURN.	
48	CRT OPR	X COORDINATE = Enter appropriate value and RETURN.	Must be integer value.
49	CRT OPR	Y COORDINATE = Enter appropriate value and RETURN RETURN.	Events #47, #48, and #49 are repeated, based on the value entered in event #46. Processing then continues at event #44.
50	CRT OPR	BUOY PATTERN SCHEMATIC ANOMALY EXPLANATION (MAX 29 CHAR): Enter explanation and RETURN.	This is a description of a buoy field not accurately represented by SPPC. Must specify if event #31 = 1.
51	CRT	BUOY-TO-BUOY DISTANCE CALCULATION REQUESTS (BUOY NUMBERS, 0 = ORIGIN)	Events #51 - #58 are processed only if event #33 ≠ 0.
52	CRT OPR	ENTER n PAIRS PAIR # 1 FIRST BUOY _____ PAIR # 1 SECOND BUOY _____ PAIR # 2 FIRST BUOY _____ (etc.) Enter appropriate number and RETURN.	n = number of distance calculation requests from event #33. Enter buoy number and RETURN after each cue for n pairs of buoys.

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
53	CRT	BUOY-TO-BUOY DISTANCE CALCULATION REQUESTS (BUOY NUMBERS, 0 = ORIGIN) PAIR #1: _____ , _____ (etc.)	This event is a summary table of the input to event #52.
	OPR	Enter RETURN.	
54	CRT	DO YOU WISH TO CHANGE ANY VALUES? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues at event #59.
	OPR	Enter 0 or 1 and RETURN.	
55	CRT	HOW MANY DO YOU WISH TO CHANGE. (IF YOU WISH TO CHANGE THEM ALL, ENTER -1):	
	OPR	Enter appropriate value and RETURN.	
56	CRT	PAIR NUMBER = _____	
	OPR	Enter appropriate value and RETURN.	
57	CRT	FIRST BUOY # = _____	
	OPR	Enter appropriate value and RETURN.	
58	CRT	SECOND BUOY # = _____	Events #56, #57 and #58 are repeated, based on the value entered in event #55. Processing then continues at event #53.
	OPR	Enter appropriate value and RETURN.	
59	CRT	TACTIC # _____ HAS BEEN ADDED	Processing continues at event #26 with n + 1 tactics listed.

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
60	CRT	DATA INPUT FILE NAME IS: xxxxxxx	
61	CRT	DATA INPUT FILE CONTAINS n TACTICS: (list of tactics follows)	
62	CRT	DO YOU WISH TO MODIFY A TACTIC? (0 = NO, 1 = YES)	If response is 0 (NO), processing continues at event #2.
	OPR	Enter 0 or 1 and RETURN.	
63	CRT	ENTER NUMBER OF TACTIC TO MODIFY. (ENTER -1 TO SUPPRESS MODIFY):	If response is -1 (SUPPRESS), processing continues at event #62.
	OPR	Enter appropriate value and RETURN.	
64	CRT	TACTIC IDENTIFIER (MAX 15 CHAR): xxxxxx	
65	CRT	DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues at event #67.
	OPR	Enter 0 or 1 and RETURN.	
66	CRT	TACTIC IDENTIFIER (MAX 15 CHAR): =	
	OPR	Enter identifier and RETURN.	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
67	CRT	TARGET APPLICATION SELECTION: CONVENTIONAL HOLDING TARGET (0 = NOT APPLICABLE, 1 = APPLICABLE): x CONVENTIONAL TRANSITING TARGET (0 = NOT APPLICABLE, 1 = APPLICABLE): x NUCLEAR HOLDING TARGET (0 = NOT APPLICABLE, 1 = APPLICABLE): x NUCLEAR TRANSITING TARGET (0 = NOT APPLICABLE, 1 = APPLICABLE): x	Listing of current target application for a particular tactic.
68	CRT	DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues at event #70.
	OPR	Enter 0 or 1 and RETURN.	
69	CRT	(Cues of event #67 are now repeated to define target applicability)	If response to event #68 is 1 (YES), processing returns to cues in event #67; enter appropriate values. Processing then continues at event #70.
	OPR	Enter 0 or 1 and RETURN after each cue.	
70	CRT	BUOY COORDINA DEFINITION FLAG (0 = USER NOT TO DEFINE COORDINATES, 1 = USER TO DEFINE COORDINATES): x	
71	CRT	DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues at event #72. If 1 (YES), processing returns to cue in event #70. Enter appropriate value and RETURN. Processing then continues at event #72.
	OPR	Enter 0 or 1 and RETURN.	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
72	CRT	NUMBER OF BUOYS IN PATTERN (2 TO 64): x	
73	CRT	DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues at event #74. If 1 (YES), processing returns to cue in event #72. Enter appropriate value and RETURN. Processing then continues at event #74.
	OPR	Enter 0 or 1 and RETURN.	
74	CRT	NUMBER OF BUOY-TO-BUOY DISTANCE CALCULATIONS (0 = NO CALCULATIONS, MAX 64): x	
75	CRT	DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues at event #76. If 1 (YES), processing returns to cue in event #74. Enter appropriate value and RETURN. Processing then continues at event #76.
	OPR	Enter 0 or 1 and RETURN.	
76	CRT	MINIMUM BUOY 1 - BUOY 2 SPACING (NM) (0 = PROGRAM DEFAULT VALUE OF 10.): x	
77	CRT	DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues at event #78. If 1 (YES), processing returns to cue in event #76. Enter appropriate value and RETURN. Processing then continues at event #78.
	OPR	Enter 0 or 1 and RETURN.	
78	CRT	MAXIMUM BUOY 1 - BUOY 2 SPACING (NM) (0 = PROGRAM DEFAULT VALUE OF 40.): x	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
79	CRT OPR	DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 0 (NO), processing continues at event #80. If 1 (YES), processing returns to cue in event #78. Enter appropriate value, and RETURN. Processing then continues at event #80.
80	CRT	BUOY POSITION ASSIGNMENT (FROM SONOBUOY POSITION PLANNER CHART): BUOY 1 CATALOG # _____ (etc.)	Listing of current sonobuoys in tactic.
81	CRT OPR	DO YOU WISH TO CHANGE ANY VALUES? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 0 (NO), and final value of event #70 = 1, processing continues at event #85; if event #70 = 0, continue at event #93.
82	CRT OPR	HOW MANY DO YOU WISH TO CHANGE? (IF YOU WISH TO CHANGE THEM ALL, ENTER -1): Enter appropriate value and RETURN.	
83	CRT OPR	BUOY NUMBER = Enter appropriate number and RETURN.	
84	CRT OPR	CATALOG # = Enter appropriate number and RETURN.	Events #83 and #84 are repeated, based on value entered in event #82. Processing then continues at event #80.

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PROGRAM OPERATING PROCEDURES FOR THE INTEGRATED COMMAND ASW PRE--ETC(U)
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TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
85	CRT	SPECIFIC BUOY COORDINATES (RANGE = -1000 TO 1000) BUOY 1 (_____ , _____) (etc.)	Listing of user-defined buoy coordinates.
	OPR	Enter RETURN.	
86	CRT	DO YOU WISH TO CHANGE ANY VALUES? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues at event #91.
	OPR	Enter 0 or 1 and RETURN.	
87	CRT	HOW MANY DO YOU WISH TO CHANGE? (IF YOU WANT TO CHANGE THEM ALL, ENTER -1):	
	OPR	Enter appropriate value and RETURN.	
88	CRT	BUOY # =	
	OPR	Enter appropriate number and RETURN.	
89	CRT	X COORDINATE =	
	OPR	Enter appropriate value and RETURN.	
90	CRT	Y COORDINATE =	Events #88, #89, and #90 are repeated, based on value entered in event #87. Processing continues at event #85.
	OPR	Enter appropriate value and RETURN.	
91	CRT	BUOY PATTERN SCHEMATIC ANOMALY EXPLANATION (MAX 29 CHAR): xxxxxx	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
92	CRT	DO YOU WISH TO CHANGE ? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues at event #93. If 1 (YES), processing returns to cue in event #91. Enter appropriate explanation and RETURN. Processing then continues at event #93.
	OPR	Enter 0 or 1 and RETURN.	
93	CRT	BUOY-TO-BUOY DISTANCE CALCULATION REQUESTS (BUOY NUMBERS, 0 = ORIGIN) PAIR # 1 : _____ , _____ (etc.)	Listing of current inter-buoy distance calculation requests.
	OPR	Enter RETURN.	
94	CRT	DO YOU WISH TO CHANGE ANY VALUES? (0 = NO, 1 = YES):	If response is 0 (NO), processing continues at event #99.
	OPR	Enter 0 or 1 and RETURN.	
95	CRT	HOW MANY DO YOU WISH TO CHANGE ? (IF YOU WISH TO CHANGE THEM ALL, ENTER -1):	
	OPR	Enter appropriate value and RETURN.	
96	CRT	PAIR NUMBER =	
	OPR	Enter appropriate number and RETURN.	
97	CRT	FIRST BUOY # =	
	OPR	Enter appropriate number and RETURN.	

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
98	CRT OPR	SECOND BUOY # Enter appropriate number and RETURN.	Events #96, #97, and #98 are repeated, based on the value entered in event #95. Processing continues at event #93.
99	CRT	TACTIC # n HAS BEEN MODIFIED.	Processing continues at event #60.
100	CRT OPR	****CORE-RESIDENT DATA INPUT FILE HAS BEEN WRITTEN TO DISK**** Enter RETURN.	Writes new updates from memory to disk for incorporation in GEOMTIP:IM, prior to executing GEOMT:IM to create new or updated tactics file. Processing continues at event #2.
101	CRT OPR	BUOY GEOMETRY NO. n pattern name	This begins the listing of the input information and calculations by GEOMT. If hard copies desired, press LF: otherwise RETURN to view following pages.
102	CRT	TARGET APPLICATIONS xxxx	Conventional, nuclear holding, transiting.
103	CRT	BUOY COORDINATES (DIMENSIONLESS) BUOY NO. X Y n x y (etc.)	Lists coordinates either input or calculated from SPPC.
104	CRT	MINIMUM BUOY (1-2) SPACING = x MILES MAXIMUM BUOY (1-2) SPACING = x MILES	As input by operator.
105	CRT	MINIMUM GEOMETRY RADIUS = x MILES MAXIMUM GEOMETRY RADIUS = x MILES	Calculated by program.

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
106	CRT	BUOY GEOMETRY NO. n tactic name (figure)	Approximate configuration of buoy pattern in tactic.
107	CRT	BUOY TO BUOY DISTANCE RATIOS (RELATIVE TO BUOY 1 - BUOY 2 SPACING) D X Y BUOY TO BUOY RATIO RATIO RATIO n_1 n_2 d x y (etc.)	Buoys input previously by operator, ratios calculated by program.
108	CRT	GEOMETRY CLASSIFICATION SUMMARY CONV. HOLDING (list) CONV. TRANSIT (list) NUCLEAR HOLDING (list) NUCLEAR TRANSIT (list)	Listing of applicable tactic numbers after each target category.
109	CRT	$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ A TASDA GEOMETRY TACTICS FILE (name of tactics file) CONTAINING n TACTICS HAS BEEN CREATED. $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$	
110	CRT	BUOY GEOMETRY NO. n tactic name (figure) (Event #110 repeated for each pattern)	Summary graphic display of the geometric configuration for all tactics in file. If EXTENDED TACTICS OUTPUT SUMMARY FLAG is set (i.e., event #15 = 1), processing continues at event #4. Otherwise, at event #5.
111	CRT	(CRT display shown on next three pages)	Expanded explanation of GEOMT and options list. Processing continues at event #2.

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action / Comment
111	CRT	YOU ARE NOW EXECUTING THE DATA INPUT MODULE FOR PROGRAM GEOMT. THIS MODULE ALLOWS THE USER TO CREATE, MODIFY, AND/OR EXAMINE THE CONTENTS OF A DATA INPUT FILE (GEOMTIP:IM) WHICH RESIDES ON DISK. THIS FILE IS ANALAGOUS TO A DATA CARD DECK THAT GEOMT WOULD READ IN A BATCH MODE ENVIRONMENT. IT IS ASSUMED THAT THE USER HAS A GENERAL KNOWLEDGE OF GEOMT DATA INPUT REQUIREMENTS AS DOCUMENTED BY NADC, WARMINSTER, PA., IN 'TASDA INPUT PREPARATION GUIDE', 01 SEP 1976. DURING THE EXECUTION OF THIS MODULE, THE DATA INPUT FILE (IF IT EXISTS) IS READ INTO COMPUTER MEMORY FROM DISK NOT MORE THAN ONE TIME. THAT READ OCCURS THE FIRST TIME EITHER A 2, 3, OR 5 OPTION IS ENTERED. ALL SUBSEQUENT USES OF 2, 3, OR 5 ACCESS THE DATA INPUT FILE IN MEMORY. ALL MODIFICATIONS, ADDITIONS, AND DELETIONS THAT YOU MAY DIRECT ARE PERFORMED IN MEMORY. THE DISK-RESIDENT FILE WILL NOT BE CHANGED UNTIL THE USER EXPLICITLY INSTRUCTS THAT UPDATES MADE IN MEMORY DURING THE CURRENT RUN BE INCORPORATED INTO THE PERMANENT DISK-RESIDENT DATA INPUT FILE (OPTION 5). THEREFORE, IF THE EXECUTION OF THE INPUT MODULE BOMBS, OR IS TERMINATED PRIOR TO ENTERING OPTION 5, FILE 'GEOMTIP:IM' WILL NOT BE ALTERED. ONCE A PARAMETER, OR SET OF PARAMETERS FOR A TACTIC IS INCORPORATED INTO THE DISK-RESIDENT FILE, IT WILL REMAIN IN THE FILE UNTIL IT IS CHANGED OR THE TACTIC IS DELETED (USING OPTION 2) OR UNTIL THE FILE IS RE-INITIALIZED (OPTION 4). THIS MEANS THAT WHEN YOU LIST THE FILE ON THE SCREEN (OPTION 3) YOU MAY SEE PARAMETERS THAT WERE ENTERED FOR PREVIOUS RUNS, BUT HAVE NO BEARING ON THE CURRENT RUN. FOR EXAMPLE, IF BUOY-TO-BUOY DISTANCE CALCULATIONS WERE REQUESTED FOR A GIVEN TACTIC ON A PRIOR RUN, THE DESIRED BUOY NUMBERS MUST HAVE BEEN ENTERED DURING THAT RUN. ON A LATER RUN, THE DISTANCE CALCULATION REQUEST MAY HAVE BEEN CANCELLED, BUT THE PREVIOUSLY ENTERED BUOY NUMBERS WOULD REMAIN IN THE FILE. THESE BUOY NUMBERS WOULD APPEAR ON THE SCREEN DURING A LISTING OF THE FILE, BUT THEIR PRESENCE WOULD NOT AFFECT THE EXECUTION OF GEOMT. IF DISTANCE CALCULATIONS WERE AGAIN REQUESTED THE STORED BUOY NUMBERS WOULD NOT HAVE TO BE ENTERED AGAIN UNLESS THEY HAD TO BE CHANGED.

TABLE 16-1. GEOMT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
111	CRT	*** NOTE *** IF YOU MAKE A MISTAKE, KEEP GOING. YOU WILL BE GIVEN THE OPPORTUNITY TO CYCLE THROUGH THIS MODULE AS MANY TIMES AS NECESSARY UNTIL YOU ARE SATISFIED WITH THE CONTENTS OF YOUR DATA INPUT FILE ON DISK. THEN, YOU MAY ENTER OPTION 1 TO COMMENCE EXECUTION OF THE MAIN SEGMENT OF GEOMT. OPTION 0: ANALOGOUS TO USING A SINGLE DATA CARD WITH THE WORD 'COPY' IN COLUMNS 1-4 (PAGE 4 OF NADC GUIDE). THE DATA INPUT FILE IS NOT ACCESSED. CONTROL IS PASSED TO THE MAIN SEGMENT OF GEOMT WHICH PRODUCES A FORMATTED LIST OF THE EXISTING TACTICS FILE (NOT DATA INPUT FILE). TACTICS FILE MUST HAVE BEEN CREATED BY PREVIOUS GEOMT RUN. OPTION 1: ENTERED WHEN USER IS SATISFIED WITH CONTENTS OF DATA INPUT FILE AND HAS WRITTEN THE FILE TO DISK (OPTION 5). CONTROL IS PASSED TO THE MAIN SEGMENT OF GEOMT FOR A STANDARD EXECUTION RESULTING IN THE CREATION OF A TACTICS FILE THAT CAN BE READ BY PROGRAM TASDA. IF THIS OPTION IS USED BEFORE CREATING THE DATA INPUT FILE, GEOMT WILL OUTPUT AN ERROR MESSAGE AND STOP. OPTION 2: ALLOWS THE USER TO ACCESS THE EXISTING DATA INPUT FILE. OPPORTUNITY WILL BE GIVEN TO DELETE ANY EXISTING TACTICS, ADD NEW TACTICS (MAX. # TACTICS IS 20), AND MODIFY ANY EXISTING TACTICS IN A MANNER ANALOGOUS TO MANIPULATING A DATA CARD DECK. CONTROL IS RETURNED TO THE OPTION LIST. THIS OPTION MAY BE ENTERED ANY NUMBER OF TIMES DURING A SINGLE EXECUTION. IF THE DATA INPUT FILE DOES NOT EXIST (SEE OPTION 4) GEOMT WILL OUTPUT AN ERROR MESSAGE AND STOP. OPTION 3: ALLOWS THE USER TO SELECTIVELY VIEW THE ENTIRE CONTENTS OF ANY, OR ALL TACTICS CONTAINED IN THE EXISTING DATA INPUT FILE. THE USER CAN THUS DETERMINE THE CURRENT STATUS OF THE FILE, MAKE HARD COPY RECORDS OF THE CONTENTS, OR DECIDE IF UPDATES ARE NEEDED. CONTROL IS RETURNED TO THE OPTION LIST. THIS OPTION MAY BE ENTERED ANY NUM-	

TABLE 16-1. GEOMT PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
111	CRT	BER OF TIMES DURING A SINGLE EXECUTION. IF THE DATA INPUT FILE DOES NOT EXIST (SEE OPTION 4) GEOMT WILL OUTPUT AN ERROR MESSAGE AND STOP. OPTION 4: THIS OPTION MUST BE USED THE FIRST TIME THAT GEOMT IS EXECUTED ON ANY DISK. IT IS NEVER AGAIN REQUIRED ON THAT DISK UNLESS THE USER WANTS TO START A NEW DATA INPUT FILE FROM SCRATCH. IT INITIALIZES THE FILE, THEN ASKS THE USER TO INPUT DATA TO DEFINE 1 OR MORE TACTICS. IF THE FILE ALREADY EXISTS, IT WILL BE RE-INITIALIZED, ERASING ALL PRIOR CONTENTS. CONTROL IS RETURNED TO THE OPTION LIST. THIS OPTION MAY BE USED ANY NUMBER OF TIMES ON A SINGLE EXECUTION. OPTION 5: INCORPORATES UPDATES MADE IN MEMORY ON THIS RUN INTO THE PERMANENT DISK-RESIDENT DATA INPUT FILE. THIS SHOULD BE DONE BEFORE RUNNING THE MAIN SEGMENT OF GEOMT (OPTION 1) BECAUSE THE MAIN SEGMENT MUST READ THE DISK-RESIDENT FILE WHEN STARTING A STANDARD EXECUTION. CONTROL IS RETURNED TO OPTION LIST. THIS OPTION MAY BE ENTERED ANY NUMBER OF TIMES IN A SINGLE EXECUTION. IF THE DATA INPUT FILE DOES NOT EXIST (SEE OPTION 4) GEOMT WILL OUTPUT AN ERROR MESSAGE AND STOP. OPTION 6: THE PROGRAM WILL IMMEDIATELY TERMINATE. THUS THE USER CAN EXAMINE OR MODIFY THE DATA INPUT FILE WITHOUT EXECUTING THE MAIN SEGMENT OF GEOMT. HIT RETURN TO CONTINUE	

SONOBUOY POSITION PLANNER CHART

BUOY CATALOG NUMBER 446 REPRESENTS THE ORIGIN
INDICATE A BUOY LOCATION BY CIRCLING THE APPROPRIATE CATALOG NUMBER
NUMBER THE BUOYS (FROM 1-NB) AS DESIRED
RECORD THE BUOY CATALOG NUMBERS OF BUOYS 1-NB (IN SEQUENCE)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165
166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198
199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231
232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264
265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297
298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363
364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396
397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429
430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462
463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495
496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528
529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561
562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594
595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627
628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693
694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726
727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759
760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792
793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825
826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858
859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891

Sonobuoy Position Planner Chart

16.2 TASDA PROGRAM

Program execution events are described in Table 16-2.

File Name:	TASDA
Function:	The TASDA program applies Monte Carlo game theory to produce optimum sonobuoy field deployment. TASDA A allows definition of a target threat (ASW scenario). TASDA B predicts the detection capabilities of each selected tactic for a given threat, simulating the passage of a target through or about the buoy field, estimating the measures of effectiveness by relative frequency of success. The division of the TASDA program into TASDA A and TASDA B is transparent to the user.
Input:	Enter parameters required to define the ASW scenario via conversational format into the TASDA Data Input Module. TASDA A processes and transfers the necessary information to TASDA B; i.e., there is no direct operator input to TASDA B on the NOVA. Note: The Data Input Module is accessible as many times as necessary to correct parameter input. These corrections should be written to disk before executing TASDA. Since a large amount of input may be required (depending upon the scenario), a listing of parameters required for a TASDA run is presented beginning on the following page.
Output:	The CRT displays intermediary output from TASDA A in the form of a summary of all input parameters. Output from TASDA B takes two forms, based on selection of full output or quick run output by the operator. The full output includes probability of detection by one or more buoys (PD1), two or more buoys (PD2), three or more buoys (PD3); mean holding time by one or more buoys (MHT1), two or more buoys (MHT2), three or more buoys (MHT3); and mean time to first detection (MTFD). The quick run output consists of PD1, MTFD, and a table of cumulative probability of detection as a function of time. Hard copies of any page of output can be made if desired.
Operator Interface:	The TASDA Data Input Module Option List and conversational format provide for maximum operator control in the initial stages of a TASDA run. The data input file may be reviewed and/or modified any number of times. Once the corrected data file is written to disk and the TASDA execution initiated, the only operator interaction is hitting RETURN when the bell rings to view output pages. The operator also has the capability to halt a TASDA run at any time, and save all data and calculations to that point for continuing the execution

later. This is described in the TASDA restart procedures, Section 16.3.

Execution Time: To the operator, execution of the TASDA A portion appears to be immediate, with the data summary output display. However, the time necessary to calculate the end results of TASDA (i.e., the measures of effectiveness) varies with the number of tactics, buoy spacings, depth schedules, figures of merit, and number of buoys. Based on these variables, a run may take less than 5 minutes or up to several hours.

TASDA Input Parameters: The TASDA data input file (TASDAIP:IM) is segmented into nine categories according to type of data. The following is a list of parameters within each category that may be required to define an ASW scenario:

CATEGORY 1: TARGET CHARACTERISTICS

TARGET TYPE
TARGET MOVEMENT
DISTANCE TRAVELED BY TARGET (if TARGET MOVEMENT = HOLDING)
BEARING LIMIT 1 (if TARGET MOVEMENT = HOLDING)
BEARING LIMIT 2 (if TARGET MOVEMENT = HOLDING)
TARGET VELOCITY SUBMERGED
TARGET VELOCITY SNORKELING (if TARGET TYPE = CONVENTIONAL)
MIN SNORKEL TIME (if TARGET TYPE = CONVENTIONAL)
MAX SNORKEL TIME (if TARGET TYPE = CONVENTIONAL)
MIN SUBMERGED TIME (if TARGET TYPE = CONVENTIONAL)
MAX SUBMERGED TIME (if TARGET TYPE = CONVENTIONAL)

CATEGORY 2: TARGET OPERATING AREA

STARTING RECTANGLE COORDINATES
- left X coordinate
- right X coordinate
- top Y coordinate
- bottom Y coordinate

ENDING RECTANGLE COORDINATES (if TARGET MOVEMENT = TRANSITING)
- left X coordinate
- right X coordinate
- top Y coordinate
- bottom Y coordinate

CATEGORY 3: AIRCRAFT CHARACTERISTICS

TIME LATE
RF RANGE

CATEGORY 4: FIGURE OF MERIT

NUMBER OF FIGURES OF MERIT
FIGURES OF MERIT

CATEGORY 5: PROPAGATION LOSS

NUMBER OF PROP LOSS CURVES
SOURCE OF PROP LOSS CURVE(S)
(last parameter repeated by NUMBER OF PROP LOSS CURVES)
FREQUENCY OF PROP LOSS (if SOURCE OF PROP LOSS = FACT O/P)
UNITS OF PROP LOSS
NUMBER OF RANGE PTS ON RANGE PROP LOSS CURVE (MAX = 200.)
PROP LOSS CURVE LABEL
PROP LOSS CURVE
NUMBER OF CONVERGENCE ZONES
CONVERGENCE ZONE ONSET RANGE (if NUMBER OF CZ's GT 0)
CONVERGENCE ZONE WIDTH (if NUMBER OF CZ's GT 0)
(last 2 parameters repeated by NUMBER OF CONVERGENCE ZONES)
(last 5 parameters repeated by NUMBER OF PROP LOSS CURVES)

CATEGORY 6: STATISTICAL PARAMETERS

RANDOM NUMBER SEED
BUOY-TO-BUOY FOM FLUCTUATION STANDARD DEVIATION
HOLDING AREA TARGET DISTRIBUTION (if TARGET MOVEMENT = HOLDING)
CENTER OF HOLDING AREA, X COORDINATE (if HOLDING AREA DISTRIBUTION = NORMAL)
HOLDING AREA STANDARD DEVIATION, X DIRECTION (if HOLDING AREA DISTRIBUTION = NORMAL)
CENTER OF HOLDING AREA, Y COORDINATE (if HOLDING AREA DISTRIBUTION = NORMAL)
HOLDING AREA STANDARD DEVIATION, Y DIRECTION (if HOLDING AREA DISTRIBUTION = NORMAL)

CATEGORY 7: TACTICS SELECTION

NUMBER OF TACTICS TO CONSIDER
TACTIC I.D. NUMBER (if NUMBER OF TACTICS GT 0)
(last parameter repeated by NUMBER OF TACTICS)
NUMBER OF BUOY SPACINGS
MINIMUM BUOY SPACING
MAXIMUM BUOY SPACING
MIN NUMBER OF BUOYS (if NUMBER OF TACTICS = 0)
MAX NUMBER OF BUOYS (if NUMBER OF TACTICS = 0)

CATEGORY 8: TACTIC DEPTH SCHEDULE ASSIGNMENT

(if NUMBER OF PROP LOSS CURVES GT 1)
NUMBER OF TACTICS RECEIVING DEPTH SCHEDULES
I.D. NUMBER OF TACTIC TO RECEIVE DEPTH SCHEDULE

TACTIC DEPTH SCHEDULE ASSIGNMENT (Continued)

NUMBER OF SCHEDULES FOR THIS TACTIC
NUMBER OF BUOYS IN THIS TACTIC
DEPTH SCHEDULE FOR THIS TACTIC
(last parameter repeated by NUMBER OF SCHEDULES)
(last 4 parameters repeated by NUMBER OF TACTICS RECEIVING DEPTH SCHEDULES)

CATEGORY 9: OUTPUT SELECTION

FLAG FOR QUICK RUN
SCALE OF CUMULATIVE PROBABILITY TABLE (if FLAG FOR QUICK RUN = QUICK)

TABLE 16-2. TASDA PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R TASDA and RETURN.	Initiate program TASDA A.
2	CRT	*** TASDA DATA INPUT MODULE OPTION LIST *** OPTION 1: EXECUTE MAIN SEGMENT OF TASDA OPTION 2: MODIFY EXISTING DATA INPUT FILE (TASDAIP:IM) OPTION 3: LIST EXISTING DATA INPUT FILE (TASDAIP:IM) ON SCREEN OPTION 4: INITIALIZE DATA INPUT FILE OPTION 5: INCORPORATE NEW UPDATES INTO PERMANENT DATA INPUT FILE OPTION 6: TERMINATE THIS RUN OPTION 7: GET EXPANDED EXPLANATION OF ABOVE OPTIONS ENTER 1, 2, 3, 4, 5, 6, OR 7:	If response to event #2: = 1, program continues at event #95. = 2, program continues at event #5. = 3, program continues at event #4. = 4, program continues at event #3. = 5, program continues at event #94. = 6, program continues at event #102. = 7, program continues at event #104.
	OPR	Enter number (1-7) and RETURN.	
3	CRT	(A data input file is being defined for the first time. If such a file already exists, a warning message is displayed.) *** A VALID TASDA DATA INPUT FILE EXISTS *** *** PLEASE CONFIRM THAT YOU WANT TO RE-INITIALIZE THE FILE *** *** ENTER 0 TO CANCEL RE-INITIALIZATION *** *** OR 1 TO CONFIRM RE-INITIALIZATION *** (ENTER 0 OR 1):	A data input file need only be created once. Any changes can be made via options 2, 3, and 5. Selecting option 4 would erase all of the current data input file. The warning message is a safeguard against accidentally keying in option 4. If response is 0 (CANCEL), processing continues at event #2. If response is 1 (CONFIRM), program continues at event #103.
	OPR	Enter 0 or 1 and RETURN.	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
4	CRT	THE TASDA INPUT FILE IS DIVIDED INTO NINE CATEGORIES ACCORDING TO TYPE OF DATA. INDICATE BELOW WHICH CATEGORIES YOU WISH TO SEE TO DETERMINE IF CHANGES ARE NEEDED. #1. TARGET CHARACTERISTICS (1 = SEE, 0 = NO SEE): #2. TARGET OPERATING AREA (1 = SEE, 0 = NO SEE): #3. AIRCRAFT CHARACTERISTICS (1 = SEE, 0 = NO SEE): #4. FIGURE OF MERIT (1 = SEE, 0 = NO SEE): #5. PROPAGATION LOSS (1 = SEE, 0 = NO SEE): #6. STATISTICAL PARAMETERS (1 = SEE, 0 = NO SEE): #7. TACTICS SELECTION (1 = SEE, 0 = NO SEE): #8. TACTICS DEPTH SCHEDULE ASSIGNMENT (1 = SEE, 0 = NO SEE): #9. OUTPUT TYPE SELECTION (1 = SEE, 0 = NO SEE):	Nine data type categories are listed sequentially, with an option to view the contents of any category. A response of 1 after any cue will display all parameters associated with that given category, along with the current value or a "no value" message for every parameter in the category. Processing continues at event #2.
	OPR	Enter 0 or 1 after each cue and RETURN.	
5	CRT	THE TASDA INPUT FILE IS DIVIDED INTO NINE CATEGORIES ACCORDING TO TYPE OF DATA. INDICATE BELOW WHICH CATEGORIES YOU WISH TO SEE FOR THE PURPOSE OF MAKING CHANGES. #1. TARGET CHARACTERISTICS (1 = SEE, 0 = NO SEE): #2. TARGET OPERATING AREA (1 = SEE, 0 = NO SEE): #3. AIRCRAFT CHARACTERISTICS (1 = SEE, 0 = NO SEE):	Cues appear sequentially after each response. When all 9 cues have been answered, continue at event #6. Then, if response in event #5 was 1 (YES) to category #: 1, continue at event #7, 2, continue at event #19, 3, continue at event #29, 4, continue at event #33, 5, continue at event #37, 6, continue at event #56, 7, continue at event #65,

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
		#4. FIGURE OF MERIT (1 = SEE, 0 = NO SEE): #5. PROPAGATION LOSS (1 = SEE, 0 = NO SEE): #6. STATISTICAL PARAMETERS (1 = SEE, 0 = NO SEE): #7. TACTICS SELECTION (1 = SEE, 0 = NO SEE): #8. TACTICS DEPTH SCHEDULE ASSIGNMENT (1 = SEE, 0 = NO SEE): #9. OUTPUT TYPE SELECTION (1 = SEE, 0 = NO SEE):	8, continue at event #74, 9, continue at event #90, after event #6.
	OPR	Enter 0 or 1 after each cue and RETURN.	
6	CRT	MANY TASDA INPUT PARAMETERS ARE NOT NEEDED FOR ALL CASES. FOR EXAMPLE, IF THE SUB IS DEFINED AS NUCLEAR, SNORKELING TIME AND SNORKELING SPEED ARE NOT REQUIRED. THIS PROGRAM MODULE WILL REQUEST ONLY THOSE PARAMETERS THAT ARE PERTINENT TO THE PROBLEM AS IT IS BEING DEFINED. HIT RETURN TO CONTINUE	Processing continues as per comments in event #5. When executing Option 2, necessary parameters will be displayed with either: 1) the current value, in which case a "DO YOU WISH TO CHANGE?" message will provide modification capability or 2) a "NO VALUE" message, in which case prompt is repeated providing input capability.
	OPR	Enter RETURN.	
7	CRT	***CATEGORY 1: TARGET CHARACTERISTICS***	
8	CRT	TYPE OF SUB: n, xxxxxx DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	n, xxxxxx = 0 CONVENTIONAL or 1, NUCLEAR. If response is 1 (YES), parameter is repeated, prompting user input.
	OPR	Enter 0 or 1 and RETURN	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
9	CRT OPR	TYPE OF MOVEMENT: n, xxxxx DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	n, xxxxx = 1, HOLDING or 2, TRANSITING. If response is 1 (YES), parameter is repeated, prompting user input. If n = 2 (TRANSITING) continue at event #12.
10	CRT OPR	DISTANCE TRAVELED BY SUB, A/C ON STATION (MILES): M.M DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	A/C = Aircraft. If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point. For a "holding" target only this is the distance travelled within the AOU before A/C arrives on station.
11	CRT OPR	SUB BEARING LIMIT 1 (DEGREES, CW FROM NORTH IS +): dd.d SUB BEARING LIMIT 2 (DEGREES, CW FROM NORTH IS +): dd.d DO YOU WISH TO CHANGE? (0 = NO, 1 = YES) Enter 0 or 1 and RETURN.	If response is 1 (YES), parameters are repeated, prompting user input. Values must include decimal point.
12	CRT OPR	SUB SPEED SUBMERGED (KNOTS): s.s DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point. If NUCLEAR sub, continue at event #18.
13	CRT OPR	SUB SPEED SNORKELING (KNOTS): s.s DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point. "NO VALUE" from previous run also prompts input.

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
14	CRT	MIN SNORKEL TIME (MINUTES): t.t DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Include decimal point.
	OPR	Enter 0 or 1 and RETURN.	
15	CRT	MAX SNORKEL TIME (MINUTES): t.t DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Include decimal point.
	OPR	Enter 0 or 1 and RETURN.	
16	CRT	MIN SUBMERGED TIME (MINUTES): t.t DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Include decimal point.
	OPR	Enter 0 or 1 and RETURN.	
17	CRT	MAX SUBMERGED TIME (MINUTES): t.t DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Include decimal point.
	OPR	Enter 0 or 1 and RETURN.	
18	CRT	TARGET CHARACTERISTICS INPUT IS NOW COMPLETE HIT RETURN TO PROCESS NEXT CATEGORY	
	OPR	Enter RETURN.	
19	CRT	***CATEGORY 2: TARGET OPERATING AREA***	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
20	CRT OPR	STARTING RECTANGLE COORDINATES FOR SUB (MILES): LEFT X COORDINATE: x.x DO YOU WISH TO CHANGE? (0 = NO, 1 = YES) Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point, and may be positive or negative for this and the next 3 (or 7) events. All coordinates should be entered in miles.
21	CRT OPR	RIGHT X COORDINATE: x.x DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point.
22	CRT OPR	TOP Y COORDINATE: y.y DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point.
23	CRT OPR	BOTTOM Y COORDINATE: y.y DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point. If target = HOLDING, continue at event #28.
24	CRT OPR	FINISHING RECTANGLE COORDINATES FOR SUB (MILES): LEFT X COORDINATE: x.x DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point. If NO VALUE is stored from previous run, input is prompted for this, and the next 3 events. All coordinates should be entered in miles.
25	CRT OPR	RIGHT X COORDINATE: x.x DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point.

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
26	CRT	TOP Y COORDINATE: y.y DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point.
	OPR	Enter 0 or 1 and RETURN.	
27	CRT	BOTTOM Y COORDINATE: y.y DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point.
	OPR	Enter 0 or 1 and RETURN.	
28	CRT	TARGET OPERATING AREA INPUT IS NOW COMPLETE HIT RETURN TO PROCESS NEXT CATEGORY	
	OPR	Enter RETURN.	
29	CRT	***CATEGORY 3: AIRCRAFT CHARACTERISTICS***	
30	CRT	TIME LATE FOR AIRCRAFT TO REACH STATION (MINUTES): t.t DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point. Maximum time late = 480 minutes.
	OPR	Enter 0 or 1 and RETURN.	
31	CRT	RF RANGE (MILES): m.m DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point. This is the maximum distance allowed between A/C and a buoy for monitoring.
	OPR	Enter 0 or 1 and RETURN.	
32	CRT	AIRCRAFT CHARACTERISTICS INPUT IS NOW COMPLETE HIT RETURN TO PROCESS NEXT CATEGORY.	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
33	CRT	***CATEGORY 4: FIGURE OF MERIT***	
34	CRT	NUMBER OF FOMS: n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. (MAX = 4)
	OPR	Enter 0 or 1 and RETURN.	
35	CRT	FOM NUMBER # (DBS): xx.x DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point. Event repeated for n FOM's.
	OPR	Enter 0 or 1 and RETURN.	
36	CRT	FIGURE OF MERIT INPUT NOW COMPLETE HIT RETURN TO PROCESS NEXT CATEGORY	
	OPR	Enter RETURN.	
37	CRT	***CATEGORY 5: PROPAGATION LOSS***	
38	CRT	NUMBER OF PROP LOSS CURVES: n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Maximum of 3 prop loss curves allowed.
	OPR	Enter 0 or 1 and RETURN.	
39	CRT	SOURCE OF PROP LOSS # b (0 = READ FACT O/P, 1 = KEY BOARD OR PRESTORED): n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Event is repeated for n # of prop losses (MAX = 3). If source = 1, continue at event #41.
	OPR	Enter 0 or 1 and RETURN.	NOTE: Once prop loss from FACT is read into data file, "source" becomes "Prestored".

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
40	CRT	FREQUENCY OF PROP LOSS(ES) FROM FACT (HZ): f.f DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. If "NO VALUE", user input is prompted.
	OPR	Enter 0 or 1 and RETURN.	
41	CRT	UNITS OF PROP LOSS (0 = NAUTICAL MILES, 1 = KYDS): u DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. If prop loss is from FACT and units = KYDS, or source = 1 and units = 0 or 1, continue at event #43.
	OPR	Enter 0 or 1 and RETURN.	
42	CRT	***WARNING: YOU HAVE REQUESTED PROP LOSS FROM FACT BUT SPECIFIED UNITS OF NAUTICAL MILES. FACT PROP LOSS IS ALWAYS IN KILOYARDS. UNITS OF PROP LOSS RANGE WILL BE CHANGED TO KILOYARDS	Warning message if source = 0 and units = 0, in event #41
43	CRT	NUMBER OF RANGE POINTS ON PROP LOSS CURVE (MAX = 200): n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input.
	OPR	Enter 0 or 1 and RETURN.	
44	CRT	PROP LOSS # b LABEL (MAX = 39 CHARACTERS): xxxxxxx DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. Processing continues at event #46 unless incorrect frequency selected for FACT prop loss data.
	OPR	Enter 0 or 1 and RETURN.	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
45	CRT	*****WARNING: YOU HAVE REQUESTED FACT PROP LOSS FREQUENCY OF f.f HZ. CURRENT FACT O/P HAS THE FOLLOWING FREQUENCIES (Hz) h.h ENTER PROPER FREQUENCY h.h	Warning message for source = 0 and incorrect value in event #40. h represents 1-4 frequencies. Decimal point must be included.
	OPR	Enter appropriate frequency and RETURN.	
46	CRT	PROP LOSS # b: xxxxx tabular listing of prop loss data by range	xxxxx = Prestored value if source = 1. b = 1, 2 or 3
47	CRT	DO YOU WISH TO CHANGE ANY VALUES? (0 = NO, 1 = YES):	If response is 0 (NO), continue at event #52.
	OPR	Enter 0 or 1 and RETURN.	
48	CRT	HOW MANY DO YOU WISH TO CHANGE? (IF YOU WISH TO PUNCH IN AN ENTIRELY NEW PROP LOSS CURVE, ENTER -1):	
	OPR	Enter appropriate value and RETURN.	
49	CRT	ENTER A RANGE POINT NUMBER TO BE CHANGED:	
	OPR	Enter appropriate number and RETURN.	
50	CRT	ENTER CORRESPONDING NEW PL VALUE	Events #49 and 50 are repeated based upon the value entered in event #48.
	OPR	Enter value including decimal point and RETURN.	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
51	CRT	(A new tabular listing of prop loss data by range, including the above changes, is now displayed)	Processing continues at event #47.
52	CRT	NUMBER OF CZS FOR PROP LOSS # b (0 = NONE OR NO DATA, MAX= 4): n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. If NONE or NO DATA, processing continues at event #55. NOTE: The number, onset range and width of CZ are all operator input at sometime, i.e., the program does not calculate these parameters from the prop loss curve(s).
	OPR	Enter 0 or 1 and RETURN.	
53	CRT	CZ ONSET RANGE FOR CZ # b (SAME UNITS AS PROP LOSS): r.r DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	Range point where CZ begins If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point.
	OPR	Enter 0 or 1 and RETURN.	
54	CRT	CZ WIDTH FOR CZ # b (SAME UNITS AS PROP LOSS): n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. If there is more than 1 prop loss curve, processing continues at event #44. Decimal point required.
	OPR	Enter 0 or 1 and RETURN.	
55	CRT	PROP LOSS INPUT NOW COMPLETE HIT RETURN TO PROCESS NEXT CATEGORY	
	OPR	Enter RETURN.	
56	CRT	***CATEGORY 6: STATISTICAL PARAMETERS***	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
57	CRT OPR	RANDOM NUMBER GENERATOR SEED (IF ZERO, PROGRAM DEFAULTS TO 87654321): n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value should be an odd number greater than 10,000. This seed is used to generate random target tracks
58	CRT OPR	BUOY-TO-BUOY FOM FLUCTUATION, 1 SIGMA VALUE (DB): f.f DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN	If response is 1 (YES), parameter is repeated, prompting user input. Value should include decimal point. If target = transiting, continue at event #64. Typical values are Atlantic- 1.0 AB Pacific - 0.5 AB Mediterranean - 2.0 AB
59	CRT OPR	HOLDING AREA TARGET DISTRIBUTION (0 = UNIFORM, 1 = 2-D NORMAL): n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. If uniform target distribution, continue at event #64. NOTE: If AOU is an ellipse or circle, choose 2-D normal. If AOU is a bearing box, choose uniform.
60	CRT OPR	HOLDING AREA CENTER OF DISTRIBUTION X (NM): x DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point.
61	CRT OPR	HOLDING AREA 1 - SIGMA X (NM): x.x DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point. NOTE: For elliptical AOU, Sigma X = 1/2 the length of the semi-major axis. For a circular AOU, Sigma X is 1/2 the radius.

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
62	CRT OPR	HOLDING AREA CENTER OF DISTRIBUTION Y (NM): y.y DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point.
63	CRT OPR	HOLDING AREA 1 - SIGMA Y (NM): y.y DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Value must include decimal point. NOTE: For an elliptical AOU Sigma Y is 1/2 the length of the semi-minor axis. For a circular AOU, Sigma Y is 1/2 the radius.
64	CRT OPR	STATISTICAL PARAMETERS INPUT NOW COMPLETE HIT RETURN TO PROCESS NEXT CATEGORY Enter RETURN.	
65	CRT	***CATEGORY 7: TACTICS SELECTION***	
66	CRT OPR	NUMBER OF TACTICS TO CONSIDER (IF ZERO, PROGRAM WILL SELECT): n DO YOU WISH TO CHANGE? Enter 0 or 1 and RETURN.	n cannot exceed 6 for a given run. If response is 1 (YES), parameter is repeated, prompting user input. If n = 0 (program select), processing continues at event #68.
67	CRT OPR	TACTIC b I.D. NUMBER: a DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Event is repeated based upon number of tactics in event #66. (b = 1-6; a = 0-20)

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
68	CRT OPR	NUMBER OF BUOY SPACINGS (IF ZERO, PROGRAM DEFAULTS TO 7): n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. If number of spacings = 1, minimum buoy spacing is used.
69	CRT OPR	MINIMUM BUOY SPACING (NM) (IF ZERO, PROGRAM DEFAULTS TO TACTICS FILE SPECS): s.s DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Values must include decimal point.
70	CRT OPR	MAXIMUM BUOY SPACING (NM) (IF ZERO, PROGRAM DEFAULTS TO TACTICS FILE SPECS): s.s DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Values must include decimal point. If program doesn't select tactic, processing continues at event #73.
71	CRT OPR	MIN # OF BUOYS TO CONSIDER (THIS GUIDES PROGRAM TACTIC SELECT): n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	Processed only if program selects tactic(s). If response is 1 (YES), parameter is repeated, prompting user input. If "NO VALUE", user input is prompted.
72	CRT OPR	MAX # OF BUOYS TO CONSIDER (THIS GUIDES PROGRAM TACTIC SELECT): n DO YOU WISH TO CHANGE? Enter 0 or 1 and RETURN.	Processed only if program selects tactic(s). If response is 1 (YES), parameter is repeated, prompting user input. If "NO VALUE", user input is prompted.

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
73	CRT	TACTICS SELECTION INPUT IS NOW COMPLETE HIT RETURN TO PROCESS NEXT CATEGORY	
	OPR	Enter RETURN.	
74	CRT	***CATEGORY 8: TACTICS DEPTH SCHEDULE ASSIGNMENT***	If number of prop loss curves > 1, continue at event #76.
75	CRT	*****WARNING: YOU HAVE REQUESTED THE DEPTH SCHEDULE CATEGORY BUT HAVE SPECIFIED ONLY 1 PROP LOSS CURVE. YOU MUST HAVE 2 OR 3 PROP LOSS CURVES TO SET UP MULTIPLE DEPTH SCHEDULES. HIT RETURN TO PROCESS NEXT CATEGORY.	Processing continues at event #90.
	OPR	Enter RETURN.	
76	CRT	NUMBER OF TACTICS TO RECEIVE DEPTH SCHEDULES: n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input.
	OPR	Enter 0 or 1 and RETURN.	
77	CRT	ID NUMBER OF TACTIC n TO RECEIVE DEPTH SCHEDULE: a DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input.
	OPR	Enter 0 or 1 and RETURN.	
78	CRT	NUMBER OF SCHEDULES FOR THIS TACTIC (MAX = 3): b DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input.
	OPR	Enter 0 or 1 and RETURN.	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
79	CRT OPR	NUMBER OF BUOYS IN THIS TACTIC (FROM TACTICS FILE): # DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Maximum number of buoys = 64.
80	CRT	SCHEDULE #b FOR TACTIC n (TACTIC ID NUMBER a)	This is a display of the existing depth schedule for a given tactic, b = (1-3), n = (1-6). If no schedule exists, continue at event #87.
81	CRT	BUOY # 1 2 3 . . . . b * x x x	b = (1-3), x = (1-3), corresponding to prop loss curves 1-3 if more than one exists.
82	CRT OPR	DO YOU WISH TO CHANGE ANY VALUES? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 0 (NO), and 1) another schedule exists for the same tactic, go to 80, b = b + 1. 2) another tactic exists (event 76 > 1), go to 77. 3) no other schedule or tactics exist, go to event #89.
83	CRT OPR	HOW MANY VALUES DO YOU WISH TO CHANGE? (IF YOU WISH TO INPUT ENTIRELY NEW SCHEDULE, ENTER -1): Enter appropriate number and RETURN.	
84	CRT OPR	ENTER BUOY NUMBER: # Enter appropriate number and RETURN.	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
85	CRT	ENTER NEW SCHEDULE VALUE FOR BUOY x	Events #84 and #85 are repeated, based upon value in event #83.
	OPR	Enter appropriate value and RETURN.	
86	CRT	BUOY # 1 2 3 . . . . b * x x x	Updated display of depth schedule. Processing continues at event #82.
87	CRT	NO SCHEDULE VALUES	
88	CRT	ENTER SCHEDULE VALUE FOR BUOY #: x	Event is repeated based upon value in event #79. Continue at event #81.
	OPR	Enter appropriate value and RETURN	
89	CRT	MULTIPLE DEPTH SCHEDULE ASSIGNMENT IS NOW COMPLETE HIT RETURN TO PROCESS NEXT CATEGORY	
	OPR	Enter RETURN.	
90	CRT	***CATEGORY 9: OUTPUT TYPE SELECTION***	
91	CRT	QUICK RUN FLAG (0 = FULL OUTPUT, 1 = PD1 ONLY): n DO YOU WISH TO CHANGE? (0 = NO, 1 = YES):	If response is 1 (YES), parameter is repeated, prompting user input. If QUICK RUN FLAG = 0 (full output), continue at event #93.
	OPR	Enter 0 or 1 and RETURN.	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
92	CRT OPR	SCALE OF CUMULATIVE PROBABILITY TABLE (IN NUMBER OF TIME STEPS) (IF ZERO, PROGRAM DEFAULTS TO 2): t DO YOU WISH TO CHANGE? (0 = NO, 1 = YES): Enter 0 or 1 and RETURN.	If response is 1 (YES), parameter is repeated, prompting user input. Processed only if QUICK RUN FLAG = 1 (PD1 only) in event #91. For example, if scale = 2 (default) table increment is 20 minutes (1/3 hr).
93	CRT OPR	OUTPUT SELECTION INPUT IS NOW COMPLETE HIT RETURN TO PROCESS NEXT CATEGORY Enter RETURN.	Processing continues at event #2.
94	CRT OPR	****CORE-RESIDENT DATA INPUT FILE HAS BEEN WRITTEN TO DISK**** HIT RETURN TO CONTINUE Enter RETURN.	Processing continues at event #2.
95	OPR CRT	When bell rings enter RETURN TACTICAL ASW SONAR DECISION AID COMPUTER PROGRAM ⋮ (etc.)	This begins listing of input parameters to TASDA A and preliminary calculations for TASDA B. Enter RETURN to view subsequent output pages.
96	CRT	$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ A TASDA INPUT FILE HAS BEEN CREATED $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ **NOTE-BE SURE TO CHECK ALL INPUTS TO TASDA A BEFORE RUNNING TASDA B** ****END OF RUN****	TASDA A processes and transfers the necessary information to TASDA B. The division of the TASDA program into TASDA A and TASDA B is transparent to the user. End of TASDA A. TASDA B begins immediately.

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
97	CRT OPR	******TASDA EXECUTION IN PROGRESS***** When bell rings enter RETURN.	Execution time: 3 min ⟶ several hours.
98			Before the results of TASDA are displayed, various messages may appear. If neither of the below conditions apply, processing continues at event #101.
99	 CRT	If there is more than one set of prop loss data, and the selected tactic (either user-defined or from program) has no assigned depth schedule(s), the program will automatically assign a default PL data depth schedule of 1, and an appropriate message will appear: ...ATTENTION... THE SONOBUOY DEPTH SCHEDULE FOR GEOMETRY TACTIC n HAS NOT BEEN EXPLICITLY SPECIFIED. THE ANALYSIS FOR THIS PATTERN WILL USE THE FOLLOWING SONOBUOY DEPTH SCHEDULE. BUOY DEPTH BUOY DEPTH BUOY DEPTH BUOY DEPTH 1 1 2 1 3 1 4 1 . . . . . . With this default feature, the user may also assign multiple depth schedules for up to 5 specific geometries and still obtain analysis of any geometry in the tactics file at the default PL data depth set 1.	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
100		If the selected tactic has buoy spacing limits which would require one or more buoys in the geometry to be outside the monitoring (RF) range of the aircraft, the signal(s) from the outside buoy(s) will be voided, and TASDA will use the information to that point. The message	
	CRT	kX.... INVALID CONFIGURATION.... (n BUOYS OUTSIDE RF RANGE)	
		will appear each time this occurs. (k = buoy spacing value, n = # of buoys)	
	OPR	When bell rings enter RETURN.	
101		Results from TASDA B are now displayed.	
		If the quick output flag is set (PD1 only), a table of cumulative probability of detection with time by FOM (repeated for n # of buoy spacings (event #68)), summary of geometry pattern, target and aircraft characteristics, buoy depth schedule (if appropriate), and a listing of PD1 and MTFD by FOM and buoy spacing are sequentially displayed. Operator should hit RETURN to view the next page. The above output "Set" is calculated and displayed for each depth schedule (max of 3) specified per tactic. Minimum 3 pages output.	
		If full output is selected, PD1, PD2, PD3, MHT1, MHT2, MHT3, and MTFD are displayed by FOM and buoy spacing. This output "Set" is also calculated and displayed for each depth schedule specified. There is only one page of output per depth schedule per tactic with this option.	
		After each output "Set", the following message appears:	
	CRT	TABULAR OUTPUT FIGURES BASED UPON 100 ITERATIONS PER BUOY FIELD SETTING	
	OPR	Enter RETURN now, and every time bell rings, indicating next output set is ready for display. Repeat until program finishes with STOP on screen.	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
102	CRT	END OF RUN STOP	End of program TASDA. Control returns to XDOS.
103	CRT	FILE TASDAIP:IM HAS BEEN INITIALIZED AND IS READY TO ACCEPT INPUT FOR A TASDA RUN. THE TASDA INPUT FILE IS DIVIDED INTO NINE CATEGORIES, ACCORDING TO TYPE OF DATA. THE CATEGORIES ARE: 1: TARGET CHARACTERISTICS 2: TARGET OPERATING AREA 3: AIRCRAFT CHARACTERISTICS 4: FIGURE OF MERIT 5: PROPAGATION LOSS 6: STATISTICAL PARAMETERS 7: TACTICS SELECTION 8: TACTICS DEPTH SCHEDULE ASSIGNMENT 9: OUTPUT SELECTION ****NOTE: CATEGORY 8 APPLIES ONLY IF MORE THAN 1 PL CURVE IS INPUT. HIT RETURN TO CONTINUE	Begin definition of ASW scenario (threat), by category. Only data pertinent to the scenario will be requested. For example, if the sub is defined as nuclear, program will not ask for snorkeling information. Prompts are similar to those for modifying an input file. Processing continues at event #2, after scenario is complete.
	OPR	Enter RETURN.	
104		Begin expanded listing of options and brief description of TASDA data input module. CRT display shown on next three pages.	Processing continues at event #2.

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
		YOU ARE NOW EXECUTING THE DATA INPUT MODULE FOR PROGRAM TASDA-A. THIS MODULE ALLOWS THE USER TO CREATE, MODIFY, AND/OR EXAMINE THE CONTENTS OF A DATA INPUT FILE (TASDAIP:IM) WHICH RESIDES ON DISK. THIS FILE IS ANALAGOUS TO A DATA CARD DECK THAT TASDA-A WOULD READ IN A BATCH MODE ENVIRONMENT. IT IS ASSUMED THAT THE USER HAS A GENERAL KNOWLEDGE OF TASDA-A DATA INPUT REQUIREMENTS AS DOCUMENTED BY NADC, WARMINSTER, PA., IN 'TASDA INPUT PREPARATION GUIDE'. 01 SEP 1976. THE CAPABILITY TO ENTER DATA IN PROGRAM TASDA-B (SEE NADC GUIDE) IS NOT AVAILABLE ON THE NOVA VERSION. DURING THE EXECUTION OF THIS MODULE, THE DATA INPUT FILE (IF IT EXISTS) IS READ INTO COMPUTER MEMORY FROM DISK NOT MORE THAN ONE TIME. THAT READ OCCURS THE FIRST TIME EITHER A 2, 3, OR 5 OPTION IS ENTERED. ALL SUBSEQUENT USES OF 2, 3, OR 5 ACCESS THE DATA INPUT FILE IN MEMORY. ALL UPDATES THAT YOU MAY DIRECT ARE PERFORMED IN MEMORY. THE DISK-RESIDENT FILE WILL NOT BE CHANGED UNTIL THE USER EXPLICITLY INSTRUCTS THAT UPDATES MADE IN MEMORY DURING THE CURRENT RUN BE INCORPORATED INTO THE PERMANENT DISK-RESIDENT DATA INPUT FILE (OPTION 5). THEREFORE, IF THE EXECUTION OF THIS MODULE BOMBS, OR IS TERMINATED PRIOR TO ENTERING OPTION 5, FILE 'TASDAIP:IM' WILL NOT BE ALTERED. ONCE A PARAMETER, OR SET OF PARAMETERS IS INCORPORATED INTO THE DISK-RESIDENT FILE, IT WILL REMAIN IN THE FILE UNTIL IT IS CHANGED (USING OPTION 2) OR UNTIL THE FILE IS RE-INITIALIZED (OPTION 4). THIS MEANS THAT WHEN YOU LIST THE FILE ON THE SCREEN (OPTION 3) YOU MAY SEE PARAMETERS THAT WERE ENTERED FOR PREVIOUS RUNS, BUT HAVE NO BEARING ON THE CURRENT RUN. FOR EXAMPLE, IF A CONVENTIONAL SUB WAS USED FOR SOME PRIOR RUN, SNORKELING TIME AND SPEED MUST HAVE BEEN INPUT AND WOULD REMAIN IN THE FILE, EVEN AFTER THE TYPE OF SUB IS CHANGED TO NUCLEAR. THESE VALUES WOULD APPEAR ON THE SCREEN DURING A LISTING OF THE FILE BUT THEIR PRESENCE WOULD NOT AFFECT THE EXECUTION OF TASDA-A WITH A NUCLEAR SUB. IF THE TYPE OF SUB WERE CHANGED BACK TO CONVENTIONAL (USING OPTION 2) THE STORED SNORKELING TIME AND SPEED WOULD NOT HAVE TO BE ENTERED AGAIN UNLESS THEY HAD TO BE CHANGED.	

TABLE 16-2. TASDA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
		NOTE IF YOU MAKE A MISTAKE, KEEP GOING. YOU WILL BE GIVEN THE OPPORTUNITY TO CYCLE THROUGH THIS MODULE AS MANY TIMES AS NECESSARY UNTIL YOU ARE SATISFIED WITH THE CONTENTS OF YOUR DATA INPUT FILE ON DISK. THEN, YOU MAY ENTER OPTION 1 TO COMMENCE EXECUTION OF THE MAIN SEGMENT OF TASDA-A, WHICH PASSES CONTROL TO TASDA-B WHEN FINISHED. OPTION 1: ENTERED WHEN USER IS SATISFIED WITH CONTENTS OF DATA INPUT FILE AND HAS WRITTEN THE FILE TO DISK (OPTION 5). CONTROL IS PASSED TO THE MAIN SEGMENT OF TASDA-A FOR EXECUTION, AND SUBSEQUENTLY TO TASDA-B. IF THIS OPTION IS USED BEFORE CREATING THE DATA INPUT FILE, TASDA-A WILL OUTPUT AN ERROR MESSAGE AND STOP. OPTION 2: ALLOWS THE USER TO ACCESS THE EXISTING DATA INPUT FILE. OPPORTUNITY WILL BE GIVEN TO SELECT THE CATEGORIES OF THE FILE TO BE SHOWN ON THE SCREEN. PARAMETERS FROM EACH SELECTED CATEGORY THAT ARE RELEVANT TO THE ASW SCENARIO BEING DEFINED WILL BE PRESENTED ALONG WITH AN OPTION TO CHANGE (IF THEY ARE PRESTORED FROM A PREVIOUS RUN) OR WILL BE REQUESTED FROM THE USER (IF THEY ARE NOT PRESTORED). THE PROCEDURE IS ANALOGOUS TO MANIPULATING A DATA CARD DECK. CONTROL IS RETURNED TO THE OPTION LIST. THIS OPTION MAY BE ENTERED ANY NUMBER OF TIMES DURING A SINGLE EXECUTION. IF THE DATA INPUT FILE DOES NOT EXIST (SEE OPTION 4) THE PROGRAM WILL OUTPUT AN ERROR MESSAGE AND STOP. OPTION 3: ALLOWS THE USER TO SELECTIVELY VIEW THE ENTIRE CONTENTS OF ANY, OR ALL OF THE 9 CATEGORIES IN THE EXISTING DATA INPUT FILE. THE USER CAN THUS DETERMINE THE CURRENT STATUS OF THE FILE, MAKE HARD COPY RECORDS OF THE CONTENTS, OR DECIDE IF UPDATES ARE NEEDED. CONTROL IS RETURNED TO THE OPTION LIST. THIS OPTION MAY BE ENTERED ANY NUMBER OF TIMES DURING A SINGLE EXECUTION. IF THE DATA INPUT FILE DOES NOT EXIST (SEE OPTION 4) TASDA-A WILL OUTPUT AN ERROR MESSAGE AND STOP.	

TABLE 16-2. TASDA PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
		OPTION 4: THIS OPTION MUST BE USED THE FIRST TIME THAT TASDA IS EXECUTED ON ANY DISK. IT IS NEVER AGAIN REQUIRED ON THAT DISK UNLESS THE USER WANTS TO START A NEW DATA INPUT FILE FROM SCRATCH. IT INITIALIZES THE FILE, THEN ASKS THE USER TO INPUT DATA TO DEFINE AN ASW SCENARIO. IF THE FILE ALREADY EXISTS, IT WILL BE RE-INITIALIZED, ERASING ALL PRIOR CONTENTS. CONTROL IS RETURNED TO THE OPTION LIST. THIS OPTION MAY BE USED ANY NUMBER OF TIMES ON A SINGLE EXECUTION. OPTION 5: INCORPORATES UPDATES MADE IN MEMORY ON THIS RUN INTO THE PERMANENT DISK-RESIDENT DATA INPUT FILE. THIS SHOULD BE DONE BEFORE RUNNING THE MAIN SEGMENT OF TASDA-A (OPTION 1) BECAUSE THE MAIN SEGMENT MUST READ THE DISK-RESIDENT FILE WHEN STARTING AN EXECUTION. CONTROL IS RETURNED TO OPTION LIST. THIS OPTION MAY BE ENTERED ANY NUMBER OF TIMES IN A SINGLE EXECUTION. IF THE DATA INPUT FILE DOES NOT EXIST (SEE OPTION 4) TASDA-A WILL OUTPUT AN ERROR MESSAGE AND STOP. OPTION 6: THE PROGRAM WILL IMMEDIATELY TERMINATE. THUS THE USER CAN EXAMINE OR MODIFY THE DATA INPUT FILE WITHOUT EXECUTING THE MAIN SEGMENT OF TASDA-A.	

16.3 RESTARTING TASDA PROGRAM

It is recognized that TASDA executions can take well over an hour to complete and that it might be necessary to use the NOVA for other applications during a TASDA run. Therefore, the capability has been added to stop TASDA at any time and preserve all intermediate calculations so that the program can be restarted at the point at which it was stopped. The procedures for stopping and restarting TASDA are documented in Tables 16-3 and 16-4. Two files (RSTASCOM:SV and RSTAS:SV) are defined and written on the system disk by the program to preserve intermediate results prior to stopping TASDA. When TASDA is restarted, these files are read and deleted. Therefore, they exist only while TASDA is stopped. When the program is stopped, the computer returns to executive mode and may be used for any other programs. A single TASDA execution may be stopped and restarted any number of times.

TABLE 16-3. PROCEDURE FOR HALTING TASDA PRIOR TO NORMAL COMPLETION

Event	Source	Statement/Operator Action	Comment
1	OPR	Enter CONTROL-D	May enter at any time during a TASDA execution to halt the run. NOTE: If CONTROL-D is entered while the program has paused to accept data input from the keyboard, a fatal run error will occur.
2	CRT	PROGRAM HALTED BY OPERATOR BREAK. DO YOU WISH TO CANCEL THIS RUN, OR PRESERVE INTERMEDIATE RESULTS FOR RESTARTING LATER? ENTER 0 TO CANCEL 1 TO RESTART:	If response = 0, processing continues at event #5. If response = 1, processing continues at event #3.
	OPR	Enter 0 or 1 and RETURN.	
3	CRT	INFORMATION NEEDED TO RESTART THIS RUN HAS BEEN PRESERVED ON DISC. TO RESTART, ENTER THE FOLLOWING COMMAND 'R RSTASDA'	It will take the program several seconds to define and write the needed files before this message appears.
4	CRT	STOP	Program ends. Control returns to XDOS.
5	CRT	RUN CANCELLED BY OPERATOR. ALL FILES HAVE BEEN CLOSED	
6	CRT	STOP	Program ends. Control returns to XDOS.

TABLE 16-4. PROCEDURE FOR RESTARTING TASDA

Event	Source	Statement/Operator Action	Comment
1	OPR	Enter R RSTASDA and RETURN.	Initiate program RSTASDA. The previous TASDA run must have been halted using the procedure described in Table 16-4.
2	CRT	TASDA EXECUTION HAS BEEN RESTARTED.	It will take the program several seconds to read and delete needed files before this message appears. Execution of TASDA resumes at the point it was halted by operator entering CONTROL-D.*
		*NOTE: If TASDA is halted while output is being displayed (e.g., TASDA A summary data or cumulative probability of detection table), the remaining display for that particular output "set" will not be saved for a restart. Rather, calculations will begin for the next output set.	

17.0 TOWED ARRAY PREDICTION SYSTEM (TAPS) MODEL

Program execution events are described in Table 17-1.

File Name: TAPS

Function: The TAPS model provides a graphical presentation of detection coverage for surface ships equipped with TACTAS (Tactical Towed Array System) AN/SQR-18 or TASS (Towed Array Surveillance System) AN/SQR-15. TAPS is designed for depiction of the coverage of towed array systems in a task force situation. The model accounts for force acoustic interference and allows threat definitions.

Input: TAPS uses the propagation loss values generated by FACT at the specific frequencies and source/receiver depth pairs stored in Z999ICAP:IM. If necessary, the user may specify threat frequencies other than those used in the FACT run. TAPS extrapolates or interpolates to the specified frequencies. TAPS allows a task force pattern to be defined, using either coordinates or range and bearing from the center of the display. Built into the TAPS model are radiated noise signatures and levels at various speeds for eleven types of Navy ships. For each ship in the task force the model requires input of the ship type code and speed. Ships may also be assigned either a TASS(S) or a TACTAS(T) sensor array. For each vessel assigned a towed array, the true heading of the ship must be input. For each threat frequency, the model allows input of recognition differential (RD), ambient noise (AN), and source level (SL). Display options and selections are also inputs.

Output: The model displays the following for a selected frequency and threat array depth combination:

1. Single sensor towed array detection coverage.
2. Force detection coverage (probability that at least one array detects).
3. Force cross fix detection coverage (probability that at least two arrays detect).

The model by default displays the 50% probability of detection level. The user may specify one or two other probability levels. TAPS also computes the total area (NMI2) within the display grid covered by the force towed arrays at the probability level selected.

Classification: Output displays detailing operational capabilities of specific sensors are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, Naval Security Regulations.

Frequency Selection:	The TAPS model can accept up to five source frequencies and three source/receiver (S/R) depth pairs. The frequencies are entered by the operator via the keyboard. They need not coincide with those frequencies selected for FACT. However, the operator should attempt to run FACT at frequencies as close as possible (if not equal to) the frequencies considered by TAPS.
Depth Selection:	The TAPS model selects S/R depth pairs from the set of depth pairs generated by FACT. In order to model own force acoustic interference TAPS requires that a shallow source (less than 100 feet) be entered for each receiver depth considered. For example, the S/R depth pair (source = 200 feet/receiver = 400 feet) is not considered by TAPS unless the S/R depth pair (source less than 100 feet/receiver = 400 feet) is also selected in FACT.
Operator Interface:	The operator runs the PROFGEN and FACT models to generate the propagation loss data in file Z999ICAP:IM. The operator responds to the TAPS model requests for data as described in Table 17 1. Special forms are provided to facilitate the collection and organization of TAPS inputs (see ICAPS TAPS Input Form).

Execution Time:	Single towed array detection coverage	1 minute
	Force detection coverage	5 minutes
	Force cross fix detection coverage	5 minutes

ICAPS TAPS INPUT FORM

(SECRET WHEN FILLED IN)

DATE/TIME ____________________

	OWN FORCE CHARACTERISTICS						
UNIT	SHIP	CODE (1-11)	SPEED (Knts)	POSITION (x, y or Range, Bearing)		SENSOR (T or S)	HEADING (in Degrees)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

	TARGET CHARACTERISTICS			NOISE DATA		
THREAT	CLASS	FREQUENCY	SOURCE LEVEL	RECOGNITION DIFFERENTIAL (t)	RECOGNITION DIFFERENTIAL (s)	AMBIENT NOISE
1		Hz	dB	dB	dB	dB
2		Hz	dB	dB	dB	dB
3		Hz	dB	dB	dB	dB
4		Hz	dB	dB	dB	dB
5		Hz	dB	dB	dB	dB

(SECRET WHEN FILLED IN)

TABLE 17-1. TAPS PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R TAPS	Initiates TAPS program.
2	CRT OPR	FACT PROPAGATION LOSS CURVES Scan and press RETURN.	Program displays source/ receiver depths and frequencies for which prop loss data are available in intermediate file Z999ICAP:IM.
3	CRT OPR	TAPS WILL PREDICT SENSOR PERFORMANCE FOR THE FOLLOWING DEPTH AND SPEED COMBINATIONS: DO YOU WANT TO STOP(S) OR CONTINUE(C)? INPUT S OR C: Enter S or C and RETURN.	Program displays speed ranges possible for arrays towed at receiver depths designated in FACT program. Enter S to terminate TAPS run if specifications unsuitable.
4	CRT OPR	RUNID: INPUT A RUN OR AREA IDENTIFIER OF UP TO 10 CHARACTERS Enter up to 10 characters and RETURN.	Run identifier.
5	CRT OPR	TIME: INPUT THE TIME AS A 4 DIGIT NUMBER (EXAMPLE 0830): Enter time and RETURN.	Time identifier; uniquely identifies current TAPS run.
6	CRT OPR	FORCE UNITS DO YOU WANT TO CHANGE THE FORCE? INPUT N, A, M, OR D Enter N, A, M, or D and RETURN.	Program displays units in force. User can No change, Add, Modify, or Delete units. If N, bell rings; make copy and/or RETURN; processing continues at event #14. If A, processing continues at event #7. If M, processing continues at event #12. If D, processing continues at event #13.

TABLE 17-1. TAPS PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
7	CRT	INPUT SHIP TYPE (1 TO 11):	Ship types: 1 - FF1097 (MOINESTER) 2 - FF1052 (KNOX CLASS) 3 - FF1037 (BRONSTEIN CLASS) FF1040 (GARCIA CLASS) 4 - CV 7 - AO 10 - LPH 5 - CG 8 - AOE 11 - LST 6 - DDG 9 - AFS
	OPR	Enter ship type and RETURN.	
8	CRT	INPUT SHIP SPEED FOR UNIT # X (1 TO 30 KNOTS):	Enter speed for ship indicated in event #7.
	OPR	Enter ship speed and RETURN.	
9	CRT	YOU MAY INPUT POSITION OF UNIT X AS: (1) X, Y (2) RANGE AND BEARING INPUT TYPE OF INPUT (1 OR 2):	Ship position input type: If response is 1, continue at event #10. If response is 2, continue at event #11.
	OPR	Enter 1 or 2 and RETURN.	
10	CRT	INPUT X COORDINATE OF UNIT X (NMI):	Unit position (x and y)
	OPR	Enter x coordinate and RETURN	
	CRT	INPUT Y COORDINATE OF UNIT X (NMI):	
	OPR	Enter y coordinate and RETURN.	Program returns to event #6.
11	CRT	INPUT RANGE OF UNIT X (NMI):	Unit position (range and azimuth).
	OPR	Enter range and RETURN.	
	CRT	INPUT AZIMUTH OF UNIT X (0 TO 360 DEG):	
	OPR	Enter azimuth and RETURN.	Program returns to event #6.

TABLE 17-1. TAPS PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
12	CRT	INPUT THE NUMBER OF THE UNIT YOU WANT TO MODIFY: INPUT UNIT NUMBER (1 TO X):	X is the number of units already entered.
	OPR	Enter number and RETURN.	Program continues at event #7.
13	CRT	INPUT THE NUMBER OF THE UNIT YOU WANT TO DELETE: INPUT UNIT NUMBER (1 TO X):	X is the number of units already entered.
	OPR	Enter number and RETURN.	Program continues at event #6.
14	CRT	SENSOR CHARACTERISTICS DO YOU WANT TO ADD, MODIFY, OR DELETE A SENSOR? INPUT N, A, M, OR D:	Program displays sensor characteristics. User can No change, Add, Modify, or Delete units. If N, bell rings; make copy and/or RETURN; processing continues at event #20. If A, processing continues at event #15. If M, processing continues at event #18. If D, processing continues at event #19.
	OPR	Enter N, A, M, or D and RETURN.	
15	CRT	INPUT THE NUMBER OF THE UNIT YOU WANT TO ADD A SENSOR TO. INPUT UNIT NUMBER (1 TO X):	Sensor unit number. X is the number of units already entered.
	OPR	Enter unit number and RETURN.	
16	CRT	INPUT SENSOR TYPE (T OR S):	Sensor types: T - TACTAS (AN/SQR-18) S - TASS (AN/SQR-15)
	OPR	Enter T or S and RETURN.	

TABLE 17-1. TAPS PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
17	CRT	INPUT TRUE HEADING OF SHIP (0 TO 360 DEG):	Ship heading.
	OPR	Enter heading and RETURN.	Processing returns to event #14.
18	CRT	INPUT THE NUMBER OF THE UNIT YOU WANT TO MODIFY SENSOR INPUT UNIT NUMBER (1 TO X):	X is the number of units already entered.
	OPR	Enter number and RETURN.	Processing continues at event #16.
19	CRT	INPUT THE NUMBER OF THE UNIT YOU WANT TO DELETE SENSOR. INPUT UNIT NUMBER (1 TO X):	X is the number of units already entered.
	OPR	Enter unit number and RETURN.	Processing continues at event #14.
20	CRT	(Summary of input)	CRT displays force and sensor summary on X, Y grid, rings bell.
	OPR	Press LF for copy or RETURN.	
21	CRT	THREAT SOURCE LEVELS (DB) INPUT NUMBER OF FREQUENCIES (1 TO 5):	Threat signature. Repeat until all frequencies entered.
	OPR	Enter 1, 2, 3, 4, or 5 and RETURN.	
	CRT	INPUT FREQUENCY (HZ):	
	OPR	Enter frequency and RETURN.	
	CRT	INPUT SOURCE LEVEL (DB):	
	OPR	Enter source level and RETURN.	

TABLE 17-1. TAPS PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
22	CRT	(Summary of threat signature) DO YOU WANT TO INPUT A NEW SET OF UP TO 5 FREQUENCIES AND SOURCE LEVELS? PLEASE INPUT Y OR N:	Modify threat signature. If Y, program continues at event #21. If N, bell rings; make copy or RETURN; processing continues at event #23.
	OPR	Enter Y or N and RETURN.	
23	CRT	RECOGNITION DIFFERENTIAL (DB) DO YOU WANT TO MODIFY RECOGNITION DIFFERENTIAL FOR ANY OF THE SENSOR TYPES IN THE FORCE? PLEASE INPUT T, S, OR N:	CRT displays listing of recognition differentials for all sensor/frequency combinations. Modify Tactas (T), Tass (S), or No change. If response is T, continue at event #24. If response is S, continue at event #25. If response is N, bell rings; make copy or RETURN; continue at event #26.
	OPR	Enter T, S, or N and RETURN.	
24	CRT	INPUT RECOGNITION DIFFERENTIAL FOR SENSOR TYPE T AT xxx HZ:	
	OPR	Input recognition differential and RETURN.	Processing returns to event #23.
25	CRT	INPUT RECOGNITION DIFFERENTIAL FOR SENSOR TYPE S AT xxx HZ:	
	OPR	Input recognition differential and RETURN.	Processing returns to event #23.
26	CRT	AMBIENT NOISE INPUTS: INPUT AMBIENT NOISE AT xxx HZ:	Repeats until all frequencies considered.
	OPR	Enter ambient noise (dB) and RETURN.	

TABLE 17-1. TAPS PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
27	CRT	(Summary) DO YOU WANT TO CHANGE YOUR NOISE INPUTS? INPUT Y OR N:	If Y, processing continues at event #26. If N, bell rings; make copy or RETURN; processing continues at event #28.
	OPR	Enter Y or N and RETURN.	
28	CRT	TAPS IS PREPARING THE DATA FOR DETECTION COVERAGE DISPLAYS. PLEASE STAND BY!	Model computation. Run errors may be shown; stand by for output.
	OPR	No response necessary.	
29	CRT	DISPLAY TYPES: DISPLAY OPTIONS: MODIFY INPUTS: STOP: PLEASE SELECT ONE OF THE ABOVE OPTIONS (1 TO X):	Processing moves to event: #6 if modifying inputs. #30 if changing display scale. #31 if changing probability levels. #32 if changing number of beams and sensor T is in force. #33 if selecting detection coverage display. #35 if terminating execution.
	OPR	Enter selection and RETURN.	
30	CRT	DISPLAY SCALE IS CURRENTLY N NMI. PLEASE INPUT NEW DISPLAY SIZE GREATER THAN OR EQUAL TO 10 NMI.	Change display scale. N = current display scale. Processing returns to event #29.
	OPR	Enter size and RETURN.	

TABLE 17-1. TAPS PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
31	CRT	DISPLAY PROBABILITY LEVELS IN EFFECT: 50. YOU MAY INPUT UP TO 2 PROBABILITY LEVELS. PLEASE INPUT NUMBER OF PROBABILITY LEVELS YOU WANT TO ENTER:	Change probability levels. Enter 1 or 2 probability levels between 0 and 100 percent; repeats until all indicated levels are entered.
	OPR	Enter 1 or 2 and RETURN.	Processing returns to event #29.
	CRT	INPUT PROBABILITY LEVEL:	
	OPR	Enter level (1 to 100) and RETURN.	
32	CRT	NUMBER OF BEAMS AVAILABLE FOR SENSOR TYPE T INPUT N OR FREQUENCY NUMBER	Change number of beams - Sensor Type T. Event repeated until operator enters N.
	OPR	Enter N or frequency number and RETURN.	If no sensor type S in force processing returns to event #29.
	CRT	INPUT THE NUMBER OF BEAMS TO BE USED AT 100 HZ	If sensor type S in force, continue at event #33.
	OPR	Enter 4, 8, 16, or 31 and RETURN.	
33	CRT	DETECTION COVERAGE DISPLAY OPTIONS: PLEASE SELECT ONE OF THE ABOVE OPTIONS (0 TO N):	Threat frequency, threat depth, and array depth selection. If 0, processing returns to event #29.
	OPR	Enter selection and RETURN.	Otherwise, processing moves to event #34.
34	CRT	DETECTION COVERAGE DISPLAY	Display is complete when cursor returns to lower left corner of screen.
	OPR	Make hard copy or RETURN.	Processing continues at event #33.
35	CRT	INPUT 999 IF YOU WANT TO STOP, 0 OTHERWISE	If 0, processing returns to event #29. If 999, program terminates.
	OPR	Enter 0 or 999 and RETURN.	Control returns to XDOS.

18.0 COMPUTER ASSISTED SEARCH SERIES (COMPASS) PACKAGE

COMPASS provides estimates of a target's location and behavior for use in planning a search by helping to focus the search thinking and by evaluating all the possibilities which arise.

After consulting the runstream (Figure 18-1) the operator chooses the appropriate program from the four which comprise the COMPASS package. These programs are:

1. DATUM
2. UPDATE
3. DETECT
4. MAP

The following is a general discussion of the input and output of these programs.

Input: The decimal point is not required for most of the numerical data. There are, however, some exceptions. For inputs which are normally less than one, the decimal point is necessary. Some of these are the random number seed, speed variations (sometimes), all probabilities, and the confidence factors.

The inputs for inchop time, course, and speed are in terms of a minimum, best and maximum value. The operator determines these values from prior knowledge of the target (both type and associated motions). A small range between minimum and maximum indicates a confidence in the prior knowledge. Another way to indicate confidence in the best value is to assign it a weighting factor greater than 1.0 (1.0 is equivalent to a uniform distribution between the minimum and maximum values). While there is no limit to the weighting factor, anything greater than 10.0 is probably insignificant. The values for the course and speed variations allow the target to make small changes in both without altering the base course and speed.

Some confusion can arise as to the meaning of time on leg, update period, and time step. Time on leg is the amount of time that the target point is associated with given course and speed variations. At the end of each leg the program assigns new variations to the target point. The update period is the time between operational events, such as searches (positive and negative) and motion update. The time step is an even division of the update period, useful for numerical purposes. Calculation of the updated values of target probability occurs only at the end of each time step. Normally the update period is the longest, while the time step is the shortest (e.g., update period = 8 hours, time on leg = 4 hours, time step = 2 hours).

Similar to the weighting factors is the confidence factor requested for a positive contact (DETECT). It is a subjective probability that

the contact (or contacts) are actually on the target of interest. For a bearing contact it is necessary to specify the primary bearing probability (0.99 if there is only one bearing), the primary and secondary bearings, and bearing sigma (resolution). Usually there is only one bearing unless it is a SOSUS contact, and then the bearings are mirror images of one another with respect to the SOSUS array orientation (e.g., if orientation is 0°, primary and secondary bearings could be 45° and 315°; if the orientation was 60°, the bearings could be 105° and 15°). The bearing sigma is the resolution of the bearing. Incorporation of range considerations into the contact information is possible by providing the prop loss data for the environment. The effects of range considerations are to further pinpoint the contact along the line of bearing by locating areas of high probability in the environment.

The use of prompts aids most alphanumeric inputs by suggesting a response or giving the maximum number of characters. Depression of the return key without another input usually results in a zero for numeric responses and a negative response for alphanumeric. It is not advisable to do this intentionally.

The programs DATUM, UPDATE, and DETECT automatically access a file named TARGET:1 for either storing or retrieving target distribution. Upon running either DETECT or UPDATE, the target distribution in TARGET:1 changes. Therefore, if one wishes to make more than one run on the same target distribution, make a copy of the TARGET:1 file prior to the run.

At various points throughout the program, make a hard copy of the display. It is particularly important to have a copy of the input (to check for correctness) and the output (for reference).

Output: The primary output program is MAP. MAP yields the probability that the target is in each particular cell. The programs DATUM and UPDATE give the target boundaries in terms of a north and south latitude and an east and west longitude. These correspond to the coordinates of the extreme points throughout the distribution, and they do not necessarily coincide with the target distribution area input in DATUM. Similarly, the center latitude and longitude does not have to be the same as the target expanse center. The former is the point the user inputs for the center, while the latter is the average of the extremes of the distribution. However, these two values are initially close (after DATUM is run).

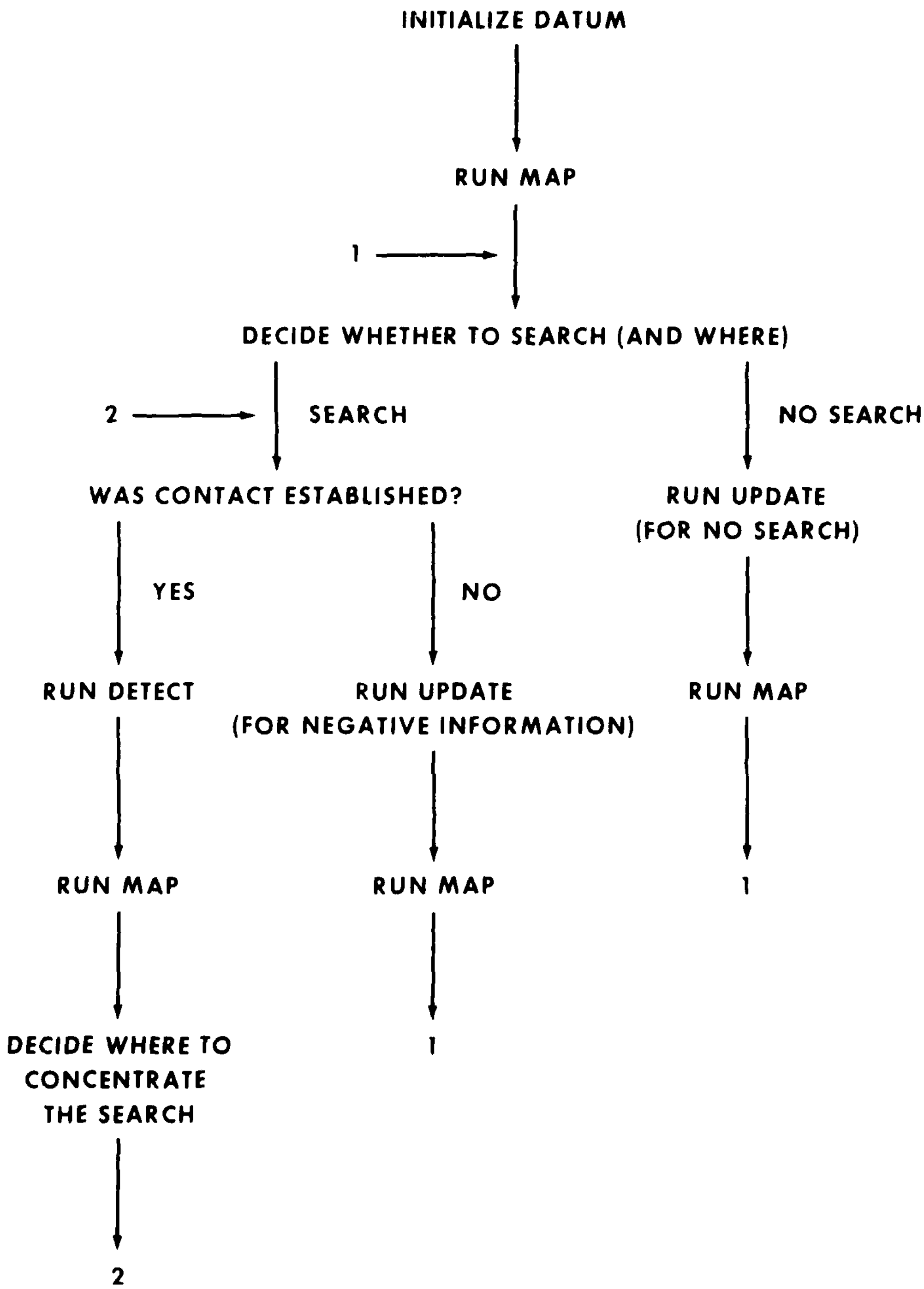

Figure 18-1. COMPASS Runstream

18.1 DATUM PROGRAM

Program execution events are described in Table 18-1.

File Name:	DATUM
Function:	Produces an initial target location distribution and records the initial target motion scenario.
Input:	Console input includes initialization of target and time data, the motion scenarios, and the type and shape of the scatter regions.
Output:	The target boundaries are output to the CRT while the target distribution locations are written into a file named TARGET:1.
Operator Interface:	The conversational format and operating sequence in Table 18-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.
Execution Time:	2 minutes.

TABLE 18-1. DATUM PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R DATUM	Initiates DATUM.
2	CRT	SPECIFY TARGET LABEL (MAX 6 CHARACTERS):	Operator gives an identifier for subsequent screen displays.
	OPR	Enter label and RETURN.	
3	CRT	SPECIFY THE NUMBER OF TARGET LOCATION SCATTER POINTS:	Typically, 1,000 target points are recommended for the NOVA.
	OPR	Enter number and RETURN.	
4	CRT	SPECIFY A RANDOM NUMBER SEED BETWEEN 0 AND 1:	Input consists of a decimal point, followed by at least 5 digits, ending with an odd digit.
	OPR	Enter number and RETURN.	
5	CRT	SPECIFY THE DTG FOR THE REFERENCE TIME:	A reference date time group must be assigned. All time quantities appearing in COMPASS are relative to the reference time.
	OPR	Enter time (Form DDHHHHMONYR) and RETURN.	
6	CRT	SPECIFY MINIMUM, BEST, MAXIMUM INCHOP TIMES (HRS REL REF):	This gives the times at which the target points arrive at the initial distribution.
	OPR	Enter numbers and RETURN.	
7	CRT	SPECIFY BEST INCHOP TIME FACTOR (MIN 1.0):	This is a weighting factor for the best inchop time specified in event #6.
	OPR	Enter time factor and RETURN.	
8	CRT	SPECIFY TOTAL NUMBER OF MOTION SCENARIOS ANTICIPATED:	Maximum of 5 If 1, processing continues at event #10.
	OPR	Enter number and RETURN.	

TABLE 18-1. DATUM PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
9	CRT	INPUT DATA FOR SCATTER REGION NUMBER X	Where X 1 initially and the following input structure is repeated as necessary until X is equal to the number of scenarios input in event #8.
	CRT	SPECIFY REGION WEIGHT:	
	OPR	Enter weight and RETURN.	The sum of the weights must be equal to 100.
10	CRT	SPECIFY TYPE OF SCATTER (E ELLIPSE C CONVEX):	If C (CONVEX), processing continues at event #13.
	OPR	Enter E or C and RETURN.	
11	CRT	SPECIFY CENTER LATITUDE, LONGITUDE:	Enter as degrees and minutes (DDMM) and for latitude N or S and longitude W or E.
	OPR	Enter position and RETURN.	
12	CRT	SPECIFY SEMI-MAJOR, SEMI-MINOR, ORIENTATION:	Operator inputs length in nautical miles of semi major (half of the longer dimension) and semi minor (half of the shorter dimension axes, and the orientation of the semi major axis in degrees, clockwise from north (000). Processing continues at event #15.
	OPR	Enter numbers and RETURN.	
13	CRT	SPECIFY NUMBER OF VERTICES:	Maximum of 8 vertices.
	OPR	Enter number and RETURN.	
14	CRT	(VERTICES MUST BE ENTERED IN CLOCKWISE ORDER)	
	CRT	SPECIFY VERTEX X LATITUDE, LONGITUDE	Where X 1 initially and the statement is repeated until X equals the number specified in event #13.
	OPR	Enter positions and RETURN.	

TABLE 18-1. DATUM PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
15	CRT	INPUT DATA FOR MOTION SCENARIO NUMBER X	Where X is the same as the number for the scatter region in event #9.
	CRT	SPECIFY EXPECTED TIME ON LEG (HRS):	Time on leg is the amount of time that target point is associated with given course and speed variations.
	OPR	Enter time and RETURN.	
16	CRT	SPECIFY MINIMUM, BEST, MAXIMUM COURSES:	Enter in degrees, where 000 is north; 090, east; 180, south; 270, west.
	OPR	Enter courses and RETURN.	
17	CRT	SPECIFY BEST COURSE WEIGHT FACTOR (MIN 1.0):	Course weight factor has same function as that in event #7.
	OPR	Enter course factor and RETURN.	
18	CRT	SPECIFY COURSE VARIATION:	Course variation is given in degrees.
	OPR	Enter variation and RETURN.	
19	CRT	SPECIFY MINIMUM, BEST, MAXIMUM SPEEDS (KTS):	
	OPR	Enter speeds and RETURN.	
20	CRT	SPECIFY BEST SPEED WEIGHT FACTOR (MIN 1.0):	
	OPR	Enter weight and RETURN.	

TABLE 18-1. DATUM PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
21	CRT	SPECIFY SPEED VARIATION	The program will repeat the sequence of events #9-21 as many times as indicated in event #8.
	OPR	Enter variation and RETURN.	Program executes when loop is complete.
22	CRT	DATUM GENERATION IS COMPLETE TARGET BOUNDARY NORTH XXXXX TARGET BOUNDARY SOUTH XXXXX TARGET BOUNDARY EAST XXXXX TARGET BOUNDARY WEST XXXXX TARGET EXPANSE CENTER XXXXX XXXXX	This gives the smallest rectangular area which encompasses all the target points. The target expanse center is simply the center of the rectangle. Hard copy of this output is recommended.
23	CRT	STOP	End of DATUM execution.

18.2 UPDATE PROGRAM

Program execution events are described in Table 18-2.

File Name: UPDATE

Function: Modifies the target motion parameters for any scenario by allowing the user to review and/or alter the current motion scenario. Primarily used for updating a failure to detect the target, called a negative search update, it may also update in time without conducting a search.

Input: The user decides whether to use an ICAPS file or median detection range, convergence zone (MDR, CZ) data for the propagation loss data source run with each scenario. If ICAPS is used, only the search type (buoy field or convex region) data and barrier type data need to be input. If MDR, CZ data are used, these data must be input at the console as well as search and barrier type data.

Output: The results of a negative search update are output to the target file (in the form of improved target distribution) and to the CRT screen. The CRT displays the single search effectiveness probability (SSEP) and the cumulative search effectiveness probability (CSEP). SSEP is the probability that the present search would detect the target, while the CSEP is the probability that all searches since the last detection would have detected the target.

Operator Interface: The conversational format and operating sequence in Table 18-2 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: 6 minutes; using the buoy placement error option with MDR, CZ propagation loss data requires an additional 3 minutes and using the ICAPS data requires an additional 8 minutes.

TABLE 18-2. UPDATE PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R UPDATE	Initiates UPDATE program.
2	CRT CRT OPR	TARGET XXXX IS READY FOR PROCESSING SPECIFY RANDOM NUMBER SEED BETWEEN 0 AND 1: Enter number and RETURN.	XXXX is the target label input in event #2 in DATUM. Input consists of a decimal point, followed by at least five digits, ending with an odd digit.
3	CRT OPR	SPECIFY UPDATE PERIOD (HRS): Enter time and RETURN.	Update period refers to the time between operational events.
4	CRT OPR	SPECIFY TIME STEP (HRS): Enter time and RETURN.	Time step is an even division of the update period (normally 1/5 to 1/10 of the update period).
5	CRT OPR	SPECIFY BASE COURSE (O = OLD N = NEW, S = MOTION SCENARIO SUMMARY): Enter O, N, or S and RETURN.	IF O (OLD), processing continues at event #16. If N (NEW), processing continues at event #8; if S, continue.
6	CRT	MOTION SCENARIO INPUT DATA SUMMARY	This is followed by the current course and speed information.
7	CRT OPR	DO YOU CONFIRM? Enter Y or N and RETURN.	If Y (YES), processing continues at event #16. If N (NO), continue.
8	CRT	DO YOU WANT TO DEFINE NEW MOTION PARAMETERS FOR SCENARIO NUMBER N?	If no, processing moves to event #16.
9	CRT OPR	SPECIFY LOW COURSE, BEST COURSE, HIGH COURSE: Enter courses in degrees and RETURN.	Enter all the motion data in events #9-14.

TABLE 18-2. UPDATE PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
10	CRT	SPECIFY BEST COURSE WEIGHT FACTOR (MIN 1.0):	
	OPR	Enter number and RETURN.	
11	CRT	SPECIFY COURSE VARIATION:	
	OPR	Enter variation in degrees and RETURN.	
12	CRT	SPECIFY LOW SPEED, BEST SPEED, HIGH SPEED:	
	OPR	Enter speeds (knots) and RETURN.	
13	CRT	SPECIFY BEST SPEED WEIGHT FACTOR (MIN 1.0):	
	OPR	Enter number and RETURN.	
14	CRT	SPECIFY SPEED VARIATION:	
	OPR	Enter variation in knots and RETURN.	
15	CRT	ARE THE INPUT DATA FOR THE PRESENT MOTION SCENARIO TYPED CORRECTLY?	This statement is preceded by a table of new course speed and direction. If N (NO), processing returns to event #9.
	OPR	Enter Y or N and RETURN.	If Y (YES), continue with next scenario in event #9 until all complete.
16	CRT	DO YOU WANT TO UPDATE FOR SEARCH?	If N (NO), processing continues at event #56 after program execution; if Y (YES), continue.
		Enter Y or N and RETURN.	NOTE: If updating for motion only, a NO response should be input.

TABLE 18-2. UPDATE PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
17	CRT	SPECIFY NUMBER OF SEARCH UNITS:	The user may choose as many as three buoy fields and five convex regions.
	OPR	Enter one number and RETURN.	
18	CRT	INPUT DATA FOR SEARCH UNIT: X	The value for X will start with one and proceed to the value input in event #17.
	CRT	SPECIFY SEARCH UNIT TYPE (B = BUOY FIELD, C = CONVEX REGION):	If C (CONVEX REGION), the processing continues at event #47.
	OPR	Enter B or C and RETURN.	In B (BUOY FIELD), continue.
19	CRT	SPECIFY SEARCH START (HRS) RELATIVE TO START OF UPDATE PERIOD:	Search start is equivalent to "time-on" for the buoy field relative to the update period. It should coincide with the time step value.
	OPR	Enter time and RETURN.	
20	CRT	SPECIFY SEAR[illegible] LIFETIME (HRS):	NOTE: A search may begin before the update period and continue after the update period, but only the part of the search in the update period is used.
	OPR	Enter time and RETURN.	
21	CRT	SPECIFY PL DATA SOURCE (1 = ICAPS, 2 = MDR,CZ):	If 1 (ICAPS), processing continues at event #26; if 2 (MDR,CZ), continue.
	OPR	Enter 1 or 2 and RETURN.	MDR,CZ is actually a probability of detection versus range curve.
22	CRT	SPECIFY MDR (NM):	MDR is median detection range - the direct path range of 50% POD.
	OPR	Enter distance and RETURN.	
23	CRT	SPECIFY DETECTION PROBABILITY AT RANGE ZERO:	Input as a decimal value between 0 and 1, inclusive.
	OPR	Enter number and RETURN.	

TABLE 18-2. UPDATE PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
24	CRT	SPECIFY NUMBER OF CONVERGENCE ZONES (MAX 2):	If zero is entered, processing continues at event #28.
	OPR	Enter number and RETURN.	
25	CRT	SPECIFY MID RANGE, WIDTH, NOMINAL PD FOR CZ X:	The X is 1; If the response to event #24 was 2, event #25 is repeated with the X equal to 2. Processing continues at event #28.
	OPR	Enter numbers and RETURN.	Mid range is the distance in nm from range zero to the midpoint of CZ X.
26	CRT	The prop loss index, source and receiver depth and frequencies are displayed. SPECIFY PL INDEX NUMBER:	
	OPR	Enter number and RETURN.	
27	CRT	SPECIFY BUOY FOM:	
	OPR	Enter FOM and RETURN.	
28	CRT	SPECIFY BUOY PLACEMENT ERROR SIGMA (NM):	If this is non-zero, there is an immediate calculation performed which takes from 2.5 to 7.5 minutes.
	OPR	Enter distance and RETURN.	
29	CRT	SPECIFY BARRIER TYPE (L = LINE, D = DISTRIBUTED, W = WALKING O = OTHER):	If O (OTHER), go to event #45; if W (WALKING), go to event #38; if D (DISTRIBUTED), go to event #34; if L (LINE), continue.
	OPR	Enter L, D, W, or O and RETURN.	
30	CRT	SPECIFY KINGPIN LATITUDE, LONGITUDE:	Line barrier begins.
	OPR	Enter position and RETURN.	

TABLE 18 2. UPDATE PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
31	CRT	SPECIFY ORIENTATION OF KINGPIN ROW (DEG CW FROM NORTH):	CW = clockwise.
	OPR	Enter degrees and RETURN.	
32	CRT	SPECIFY BUOY SPACING (NM):	
	OPR	Enter distance and RETURN.	
33	CRT	SPECIFY NUMBER OF BUOYS:	Maximum of 32 buoys possible.
	OPR	Enter number and RETURN.	Processing continues at event #55.
34	CRT	SPECIFY KINGPIN LATITUDE, LONGITUDE:	Distributed barrier begins.
	OPR	Enter position and RETURN.	
35	CRT	SPECIFY ORIENTATION OF KINGPIN ROW (DEG CW FROM NORTH):	CW = clockwise.
	OPR	Enter degrees and RETURN.	
36	CRT	SPECIFY BUOY SPACING (NM):	
	OPR	Enter distance and RETURN.	
37	CRT	SPECIFY ROW SPACING (NM):	Processing continues at event #55.
	OPR	Enter distance and RETURN.	
38	CRT	SPECIFY KINGPIN LATITUDE, LONGITUDE:	Walking barrier begins.
	OPR	Enter position and RETURN.	
39	CRT	SPECIFY ORIENTATION OF KINGPIN ROW (DEG CW FROM NORTH):	CW = clockwise.
	OPR	Enter degrees and RETURN.	

TABLE 18-2. UPDATE PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
40	CRT OPR	SPECIFY BUOY SPACING (NM): Enter distance and RETURN.	
41	CRT OPR	SPECIFY NUMBER OF ROWS: Enter number and RETURN.	Maximum is 9 rows.
42	CRT OPR	SPECIFY NUMBER OF BUOYS PER ROW: Enter number and RETURN.	
43	CRT OPR	SPECIFY WALK BEARING (DEG CW FROM NORTH): Enter bearing and RETURN.	
44	CRT OPR	SPECIFY DISTANCE (NM) ALONG WALK BEARING BETWEEN ROW X AND ROW X + 1: Enter distance and RETURN.	This is repeated once for each row input in event #41. Processing continues at event #55.
45	CRT OPR	SPECIFY NUMBER OF BUOYS (MAX 32): Enter number and RETURN.	Begin specification of user-defined buoy pattern.
46	CRT OPR	SPECIFY BUOY X LATITUDE, LONGITUDE: Enter position and RETURN.	Where X begins at 1 and the statement is repeated until X is equal to number of buoys input at event #45. Processing continues at event #55.
47	CRT OPR	SPECIFY SEARCH START (HRS) RELATIVE TO START OF UPDATE PERIOD: Enter time and RETURN.	Convex buoy region begins. Time-on and time-off should also coincide with time step.

TABLE 18-2. UPDATE PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
48	CRT	SPECIFY SEARCH LIFETIME (HRS):	
	OPR	Enter time and RETURN.	
49	CRT	SPECIFY DETECTION PROBABILITY IN REGION:	Enter as a decimal value between 0 and 1, inclusive.
	OPR	Enter PD and RETURN.	
50	CRT	SPECIFY K OR V (K = KINGPIN DATA V = VERTEX DATA):	If V (VERTEX) is entered, processing continues at event #53; if K (KINGPIN), continue.
	OPR	Enter K or V and RETURN.	
51	CRT	SPECIFY VIRTUAL KINGPIN LATITUDE, LONGITUDE:	
	OPR	Enter position and RETURN.	
52	CRT	SPECIFY FIELD DEPTH, WIDTH ORIENTATION:	
	OPR	Enter values and RETURN.	Processing continues at event #55.
53	CRT	SPECIFY NUMBER OF VERTICES (MAX 8):	
	OPR	Enter number and RETURN.	
54	CRT	(ENTER VERTEX LATITUDE, LONGITUDE PAIRS IN CW ORDER) SPECIFY VERTEX X LATITUDE, LONGITUDE	X begins at 1 and the statement is repeated until X equals the total number of buoys input at event #53.
	OPR	Enter positions and RETURN.	

TABLE 18-2. UPDATE PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
55	CRT OPR	ARE THE INPUT DATA FOR THE PRESENT SEARCH UNIT ENTERED CORRECTLY? Enter Y or N and RETURN.	End of search unit. If N (NO), processing returns to event #18 to obtain the correct input data. If Y (YES), the processing either returns to event #18 to obtain search data for next search unit if the number in event #17 was greater than one, or the execution begins if all search units have been defined.
56	CRT CRT	The target name, the reference time and the updated period(s) are displayed. The current target boundary lines are listed (N, S, E, W).	 If update for time alone event #16), processing continues at event #58.
57	CRT	This is followed by: RESULTS OF SEARCH EFFORT SSEP = 0.xxxxx CSEP = 0.xxxxx	SSEP (single, search effectiveness probability) is the probability that the search accounted for in the last update would detect the target provided a large number of identical searches were performed. CSEP (cumulative search effectiveness probability) is the probability that all searches applied since the last detection would have detected the target.
58	CRT	STOP	End of UPDATE execution.

18.3 DETECT PROGRAM

Program execution events are described in Table 18-3.

File Name:	DETECT
Function:	Creates a new target distribution for a positive contact by using the actual detection information available.
Input:	User inputs one of the four contact options (bearing, omnidirectional, normal, convex) and accompanying data.
Output:	The CRT displays a detection summary showing the target point count and weight, by scenario index, both before and after the detection.
Operator Interface:	The conversational format and operating sequences in Table 18-3 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.
Execution Time:	2 minutes (with buoy placement error, MDR,CZ data require an additional 3 minutes and ICAPS data an additional 6 minutes).

TABLE 18-3. DETECT PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R DETECT	Initiates DETECT.
2	CRT	TARGET XXXX IS READY FOR PROCESSING	XXXX is the name given to the target file during DATUM.
	CRT	DO YOU WANT TO RESET CSEP TO ZERO?	Usually reset if prosecuting a new target (when no contact in update).
	OPR	Enter Y or N and RETURN.	
3	CRT	SPECIFY NUMBER OF POSITIVE CONTACTS:	Maximum of 5 contacts.
	OPR	Enter number and RETURN.	
4	CRT	SPECIFY NUMBER OF TARGET POINTS AFTER REGEN:	Should be the same number as input for event #3 of DATUM.
	OPR	Enter number and RETURN	
5	CRT	SPECIFY RANDOM NUMBER SEED:	Enter as a decimal point, followed by at least 5 digits ending with an odd digit.
	OPR	Enter number and RETURN.	
6	CRT	SPECIFY CONFIDENCE FACTOR:	Enter as a decimal value between 0 and 1, inclusive.
	OPR	Enter number and RETURN.	
7	CRT	INPUT DATA FOR POSITIVE CONTACT NO. X	Initially X = 1, but will cycle through all values up to the number of contacts input at event #3 as the data are completed for each contact.

TABLE 18-3. DETECT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
8	CRT OPR	SPECIFY CONTACT TYPE (B - BEARING O - OMNIDIR N NORMAL C - CONVEX): Enter B, O, N, or C and RETURN.	If C (CONVEX), processing continues at event #30; if N (NORMAL), processing continues at event #27; if O (OMNIDIRECTIONAL), processing continues at event #17; if B (BEARING), continue.
9	CRT OPR	SPECIFY CONTACT IDENTIFICATION (MAX 4 CHARACTERS) Enter identifier and RETURN.	Bearing contact begins.
10	CRT OPR	SPECIFY SENSOR LATITUDE, LONGITUDE Enter position and RETURN.	
11	CRT OPR	SPECIFY PRIMARY BEARING PROBABILITY Enter probability and RETURN	Enter as a decimal value between 0 and 1, inclusive.
12	CRT OPR	SPECIFY PRIMARY BEARING Enter bearing and RETURN.	If response to event #11 is .99 or greater, processing continues at event #14.
13	CRT OPR	SPECIFY SECONDARY BEARING Enter bearing and RETURN.	For SOSUS, the secondary bearing is a mirror image of primary bearing with respect to the SOSUS orientation.
14	CRT OPR	SPECIFY BEARING SIGMA (DEG): Enter degrees and RETURN.	Bearing resolution.

TABLE 18-3. DETECT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
15	CRT	DO YOU WANT TO APPLY RANGE CONSIDERATION?	If N (NO), processing continues at event #33; if Y (YES), continue. Range consideration is used to further pinpoint the contact along the line of bearing by locating areas of high probability.
	OPR	Enter Y or N and RETURN.	
16	CRT	SPECIFY PL DATA SOURCE (1 = ICAPS 2 = MDR, CZ):	If 1 (ICAPS), processing continues at event #20; if 2 (MDR, CZ), processing continues at event #22.
	OPR	Enter 1 or 2 and RETURN.	
17	CRT	SPECIFY CONTACT IDENTIFICATION (MAX 4 CHARACTERS):	Omnidirectional contact begins.
	OPR	Enter identifier and RETURN.	
18	CRT	SPECIFY SENSOR LATITUDE, LONGITUDE	
	OPR	Enter position and RETURN.	
19	CRT	SPECIFY PL DATA SOURCE (1 = ICAPS 2 = MDR, CZ)	If 2 (MDR, CZ), processing continues at event #22; if 1 (ICAPS), continue.
	OPR	Enter 1 or 2 and RETURN.	
20	CRT	Prop loss index, source and receiver depths and frequency are listed for previously run ICAPS case.	
	CRT	SPECIFY PL INDEX NUMBER:	
	OPR	Enter number and RETURN.	
21	CRT	SPECIFY SENSOR FOM:	Processing continues at event #26.
	OPR	Enter number and RETURN.	

TABLE 18-3. DETECT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
22	CRT	SPECIFY MDR (NM):	MDR-median detection range.
	OPR	Enter distance and RETURN.	
23	CRT	SPECIFY DETECTION PROBABILITY AT RANGE ZERO	Enter as a decimal value between 0 and 1, inclusive.
	OPR	Enter number and RETURN.	
24	CRT	SPECIFY NUMBER OF CONVERGENCE ZONES (MAX 2):	
	OPR	Enter number and RETURN.	
25	CRT	SPECIFY MID RANGE, WIDTH, NOMINAL PD FOR CZ X	Where X = 1 initially, and the statement is repeated for X = 2 if two convergence zones were input at event #24.
	OPR	Enter values and RETURN.	
26	CRT	SPECIFY BUOY PLACEMENT ERROR SIGMA (NM):	Processing continues at event #33.
	OPR	Enter distance and RETURN.	
27	CRT	SPECIFY CONTACT IDENTIFICATION (MAX 4 CHARACTERS):	Normal contact begins.
	OPR	Enter identifier and RETURN.	
28	CRT	SPECIFY CENTER LATITUDE, LONGITUDE:	
	OPR	Enter position and RETURN.	

TABLE 18-3. DETECT PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
29	CRT OPR	SPECIFY SEMI-MAJOR, SEMI-MINOR, ORIENTATION: Enter values and RETURN.	Processing continues at event #33.
30	CRT OPR	SPECIFY CONTACT IDENTIFICATION (MAX 4 CHARACTERS): Enter identifier and RETURN.	Convex contact begins.
31	CRT OPR	SPECIFY NUMBER OF VERTICES (MAX 8): Enter number and RETURN.	
32	CRT OPR	SPECIFY VERTEX X LATITUDE, LONGITUDE Enter position and RETURN.	Where X begins as 1 and this statement is repeated until X is equal to the number of vertices input in event #31.
33	CRT OPR	ARE THE INPUT DATA FOR THE PRESENT CONTACT ENTERED CORRECTLY? Enter Y or N and RETURN.	If N (NO), the processing returns to event #7 for the same contact number; if Y (YES), the processing either returns to event #7 for the next contact information to input, or executes if all contact information is input.
34	CRT	The detection run is now completed. The updated time is given on the screen as well as number of points and percent weights both before and after detection (regeneration) for each scenario.	
35	CRT	STOP	End of DETECT execution.

18.4 MAP PROGRAM

Program execution events are described in Table 18-4.

File Name:	MAP
Function:	Provides several display options for presenting the current status of the target distribution mass. This aids the decision on whether to search, and where to best concentrate the search.
Input:	User specifies the center of the map, the map size, and the desired map options.
Output:	The program produces a collection of target file statistics, including data on the last updates, scenarios, and probabilities. It also displays either a quick map, detailed map, or list of top probability cells.
Operator Interface:	The conversational format and operating sequence in Table 18-4 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.
Execution Time:	30 seconds.

TABLE 18-4. MAP PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R MAP	Initiates MAP program.
2	CRT	SPECIFY TARGET FILE NAME TARGET: N N = 1 THRU 5:	Usually the file name entered is TARGET:1, unless a back-up file has been created at some point.
	OPR	Enter file name and RETURN.	(Write out TARGET)
3	CRT	SPECIFY CENTER LATITUDE, LONGITUDE:	Display extends ± 25 cell widths from map center. Map center need not be the same as the target expanse center.
	OPR	Enter latitude (with N or S) and longitude (with W or E), and RETURN.	
4	CRT	SPECIFY CELL SIZE (MINUTES):	Either 15 or 30 minutes is normally adequate.
	OPR	Enter size and RETURN.	
5	CRT	DO YOU WANT A DUPLICATE FILE CREATED?	If N (NO), processing continues at event #7.
	OPR	Enter Y or N and RETURN.	
6	CRT	SPECIFY DUPLICATE FILE NAME TARGET: N N = 1 THRU 5	Creates a backup file if desired.
	OPR	Enter number and RETURN.	Response must be different from response to event #2
6	CRT	(Program now displays tabular information on the file, updates, probabilities and scenario weights)	A hard copy is recommended.
	CRT	PAUSE	
	OPR	RETURN.	

TABLE 18-4. MAP PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
8	CRT	MAP OPTIONS 1 - QUICK MAP 2 DETAILED MAP 3 - TOP PROBABILITY CELLS 4 - NO FURTHER MAP SPECIFY MAP OPTION DESIRED:	For 2, processing continues at event #10. For 3, processing continues at event #11. For 4, processing continues at event #13.
	OPR	Enter number and RETURN.	
9	CRT	QUICK MAP CENTERED ON XXXXX XXXXX CELL SIZE OF XX MINUTES (The program then gives the legend for the map, followed by the map)	Center is same as input at event #3. Cell size is that entered at event #4 Wait until program advances to PAUSE before pressing RETURN.
	CRT	PAUSE	A hard copy is recommended.
	OPR	RETURN.	The program returns to event #8.
10	CRT	TARGET LOCATION PROBABILITY DISTRIBUTION (The cell probabilities are to the nearest whole percent.)	
	CRT	PAUSE	A hard copy is recommended.
	OPR	RETURN.	The return causes the map panels to advance. A hard copy of each panel is recommended. After the last map panel, the program returns to event #8.
11	CRT	SPECIFY NUMBER OF TOP PROBABILITY CELLS DESIRED:	Usually 20 to 25 should yield enough information.
	OPR	Enter number and RETURN.	

TABLE 18-4. MAP PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
12	CRT	PROBABILITY AND LOCATION (SE CORNER) OF THE XX MOST LIKELY CELLS (The XX most likely cells are then given in tabular form, along with cumulative probability)	The number of cells is that input in event #11.
	CRT	PAUSE	A hard copy is recommended. The program returns to event #8.
	OPR	RETURN.	
13	CRT	STOP	End of MAP execution.

19.0 MISCELLANEOUS FORMS

In addition to the various forms included to aid the operator during program operations, two other types of forms are included as part of the ICAPS system package: the Software Trouble Report (STR) and the ICAPS Computer Usage Log.

19.1 SOFTWARE TROUBLE REPORT (STR)

All of the ICAPS Mission Software is under configuration control, managed by NAVOCEANO. This means that no new software or changes to existing software, no matter how small, may be arbitrarily introduced into the system. All proposed changes to the ICAPS baseline software must follow a series of formal procedures and receive approval by the Configuration Control Board, prior to being incorporated and sent out to Fleet users. One method of initiating this change procedure is by use of the STR.

The Software Trouble Report should be used when an operator encounters an unexpected problem or suspects an error in any of the application programs. A description of the problem or suspected error should be included in as much detail as possible, such that the exact sequence of events may be recreated on the ICAPS system at NAVOCEANO to verify the reported problem and take appropriate action. If possible, hard copies of the CRT screen substantiating the problem should be submitted with the STR.

Additionally, the STR may be used for submitting suggestions for improvements to the ICAPS software. All such comments from the user community are welcomed and encouraged.

19.2 COMPUTER USAGE LOG

A Computer Usage Log is included to facilitate any record-keeping requirements a particular site may have. Since the majority of the operational ICAPS sites are an FTAS augmented system, the log could be used to record how much time the NOVA is used for ICAPS processing vice PP2 execution or alternately, the log could be used to record operator hours for scheduling or training purposes.

ICAPS

SOFTWARE TROUBLE REPORT (STR)

PLATFORM	DATE:	PROGRAM:

DESCRIPTION

THIS SECTION TO BE COMPLETED BY NAVOCEANO

NO	DATE RECEIVED:	DATE CORRECTED:
CATEGORY	PRIORITY (1-5)	

ACTION TAKEN

CATEGORY TYPES

(S) - Software Trouble
(D) - Documentation Trouble
(E) - Design Trouble
(L) - Logic Trouble

Mail to: NAVAL OCEANOGRAPHIC OFFICE
NSTL STATION
BAY ST. LOUIS, MS 39522
ATTN: Code 9220

ICAPS
COMPUTER USAGE LOG

DATE	TIME ON	TIME OFF	NAME	REMARKS

20.0 QANTEX TAPE UNIT UTILITIES

The Qantex provides an easy and reliable method for storage of environmental and system data. It can also be used as a means of loading system diagnostic programs independently of the disk. A description of data storage and retrieval using the Qantex follows. Special Qantex procedures are included.

20.1 GENERAL DESCRIPTION

The Qantex utilizes the 3M Data Cartridge as the storage medium. The specifications required to order additional cartridges are:

Data Cartridge (3M DC 300A, ITC TC-2000, WABASH Quadronix)
Tape - Computer grade magnetic tape-length 300 ft. of usable storage.

Cartridges are equipped with a write protect switch. Positioning the write protect switch to "SAFE" prevents any writing to the cartridge.

Each cartridge consists of four (4) tracks. Tracks can be accessed independently of each other, (i.e. a read or write operation on one track does not in any way affect the other tracks). Files are referenced by file and track numbers; e.g., 2:1/CTU0 would refer to file 2 of track 1. The device name for the Qantex Unit is CTU0. Files are written sequentially (file 1 must exist in order to create file 2). File zero (0) represents the beginning file of each track.

There are two different formats for transferring data from the disk to the cartridge, one of which is the output format. The output format writes file names, protection flags (if any), and contents of each file specified to cartridge. If files are written to cartridge with an OUTPUT command, they are restored to disk with an INPUT command.

Examples: >> OUTPUT @:PR, 0:1/CTU0, L writes to file 0 of track 1 of the cartridge, in output format, all files on the system device having the extension PR. The names of the files output will be listed on the operator's console.

>> INPUT 0:1/CTU0, AOF, L returns to the system device, all files stored in output format on file 0 of track 1. The files will be defined on the disk if necessary or if they already exist, data will be written over the existing data. A listing of the files written to the system device will appear on the operator's console as each file is input.

>> OUTPUT MED:PR/XDP1, 1:1/CTU0
Outputs the file MED:PR on device /XDP1 to file 1 of track 1.

Another method of data transfer from disk to cartridge is by use of the COPY command. This command copies the entire contents of one file to another file. Unlike the output format, file names and protection flags are not issued. Files that are copied to cartridge can only be returned to the disk with a COPY command.

Example: >> COPY BT37:PR, 3:3/CTU0
Copies the contents of BT37:PR to file 3 of track 3.

>> COPY 3:3/CTU0, BT37:PR
Copies the contents of file 3 of track 3 to the predefined disk file, BT37:PR.

20.2 QANTEX BOOTLOADER

The following describes the procedure used to create the Qantex bootloader on cartridge. Instructions to load the bootloader using the panel switches are provided also. These procedures are essential in duplicating the system diagnostic cartridge and generating the system from cartridge.

I. Creating the bootloader

1. Insert blank cartridge with write protect switch set to "NOT SAFE".

2. >> RUN QTBLGN
Input 22 and press return when the system requests "DEVICE ADDRESS=".

3. The system will respond "READY UNIT 0". Set the track select switch to the desired track and press return. This step is repeated if the operator wishes to generate the bootloader on other tracks. Otherwise, set the track select switch to "OFF" and press CONTROL - D to terminate the program.

II. Loading the Qantex bootloader

1. After inserting a cartridge which has a bootloader on file 0 created by QTBLGN into the drive unit, manually set the following memory locations using the switch register (detailed procedure in Section 3.6):
octal location 376: 60122_8
octal location 377: 377_8

2. Set the switch register to octal location 376

3. Press RESET and START. This will load the bootloader program from file 0 and cause the computer to halt at octal location 77000. The address panel will display octal 77001.

4. The bootloader can then be used to load programs from any subsequent files on the tape into memory. To do so, set the low order switches (13-15) to the number of the file desired and press CONTINUE.

20.3 DIAGNOSTIC DATA CARTRIDGE DUPLICATION PROCEDURE

1. Insert DIAGNOSTIC CARTRIDGE with write protect switch set to "SAFE".

2. >> IP 0:4/CTU0, AOF, L

3. >> AC TAPE:AC

4. Remove DIAGNOSTIC CARTRIDGE

5. Insert blank cartridge with write protect switch set to "NOT SAFE"

6. Execute the bootloader generator, QTBLGN on tracks 1 and 3 as described in section on cheating the bootloader.

7. -> AC TAPEDUP:AC

Contents of Diagnostic Data Cartridge

TRACK 1

file	
0	Bootloader (QANTEX)
1	System Loader
2	DFMDIAG
3	DIAADR
4	DIAARITH
5	DIACKB:4
6	DIAINST
7	DIALOG
8(10_8)	DIAMUDV
9(11_8)	DIATELET
10(12_8)	DFMCPY:AB

TRACK 3

file	
0	Bootloader (QANTEX)
1	System Loader
2	XFLBGN:AB
3	XFLDGN:AB
4	XFMNGNQ:AB
5	XFEXGN:AB
6	XFDRGN:AB

TRACK 2

file (OUTPUT FORMAT)
0 All files of track 1
including the following:
QTUL
QTBLGN
QANTEST
DFMCPY

TRACK 4

file (OUTPUT FORMAT)
0 All files of track 3
including the following
XFLBGN
XFLDGN
XFMNGNQ
XFEXGN
XFDRGN
TAPE :AC
BACKUP

20.4 SYSTEM GENERATION FROM QANTEX TAPE

The following describes the procedure used to generate XDOS from the system generation cartridge. This special tape includes both XEBEC system generation software and ICAPS software. Track 1 of the cartridge consists of these files:

File 0 - Bootloader program
1 - Label Generator program
2 - Loader Generator program
3 - Monitor Generator program
4 - Executive Generator program
5 - Directory Generator program
6 - SYSTEM:AC
7 - Start of ICAPS software

INSTRUCTIONS

1. Load the Qantex bootloader using the switch register as described in the section on loading the bootloader.

II. Executing the system generation programs

The following instructions are to be executed for the programs in files 1 through 5 in order.

1. Hit STOP and RESET.

2. Set the switch register to octal 77000 and press START. The computer will halt immediately.

3. Set the low order (13-15) switches to the binary number of the file to be loaded. Hit CONTINUE to load and run the program in that file.

4. Run the program in accordance with the instructions given in Section IV.

5. When the fifth program has been executed, hit STOP and load XDOS from the platter to be generated.

III. Loading the ICAPS software

1. Input the program SYSTEM:AC with the command >>IP 6:1/CTU0,/XDP0, UF, L.

2. Input the ICAPS software with the command >>AC SYSTEM:AC.

IV: Details of the system generation programs

The descriptions below consist of the queries of the programs and the user responses that should be input to generate a system in the format used by ICAPS. In several programs, the default values are used entirely, with two exceptions:

(1) the query "FMPRM" must be given value "F2."

(2) "PCKNO" must be given the value "0" if the removable platter is to be generated, or

the value "1" if the fixed platter is to be generated.

It [illegible]portant that these values be used in all of the programs. Also, the query "[illegible]NO" will be displayed after the program has executed successfully: entering "control D" causes the program to halt.

A default value is selected by striking the return key when the query appears. A dash is used below to denote a default value.

1 Label Generator
default values used

2. Loader Generator
default values used

3. Monitor Generator

Query	Response
FMPRM?	F2
NFLSL?	6
KOCIAD?	-
KOCOAD?	-
KCDCAD?	-
KCDLNL?	73.
KCDPGL?	35.
KGDCAD?	-
KHCCAD?	-
KHCLNL?	73.
KHCPGL?	35.
KKBCAD?	-
TKICAD?	-
TPOCAD?	-
TPOLNL?	
TPOPGL?	-
TTPCAD?	-
TTRCAD?	-
QCTCAD?	22
QCTORL?	-
QCTMIL?	
XFSCAD?	-
XFSCAW?	
PARAMETERS?	Y
PCKNO?	0 or 1

(Values not shown here are output between several of the queries.)

4. Executive Generator
   default values used

5. Directory Generator

Query	Response
FMPRM?	F2
NFDEN?	-
LSCYL?	203.
PARAMETERS?	Y
PCKNO?	0 or 1
OVERRIDE?	Y

20.5 ICAPS HISTORICAL ATLAS CARTRIDGE

The ICAPS Historical Atlas Cartridge contains the ICAPS Water Mass History File for all ocean areas presently covered by ICAPS. The cartridge is written in output format with one ocean area (e.g., Atlantic Area A) existing on each cartridge file. Each area includes the data for all seasons.

The ICAPS retrieval process requires that the Atlas file for the area of interest reside on the disk. An attempt to retrieve data from an Atlas file that is not on the disk results in the error message: ***ATLAS SOUGHT NOT ON PLATTER***. Due to disk storage limitations, all of the ICAPS Atlases cannot reside on the disk simultaneously. However, the Atlas Cartridge allows the operator to select individual Atlas files for use when needed. The files are written from the cartridge to the disk by issuing the INPUT command. The cartridge label lists each ocean area along with its corresponding cartridge file numbers.

Example: If the operator requires the historical information from PACIFIC AREA A, (i.e. PACA) and assuming it does not exist on either the removable or fixed disk:

1. Insert Atlas Cartridge with its write inhibit indicator set to "SAFE".

2. Set write inhibit switch on disk drive to "OFF" for the disk pack to be copied to. The command string necessary to input this file to the disk is:

3. IP 1:3/CTU0 ,, AOF, L

4. Remove cartridge when finished transferring atlas file(s) to disk and return to safe place for future reference.

CONTENTS OF THE ICAPS HISTORICAL ATLAS CARTRIDGE

ATLAS FILE	CART. FILE:TRACK	ATLAS FILE	CART FILE:TRACK
ATLA	0:1	PACC	2:1
ATLB	0:2	PACD	2:2
ATLC	0:3	PACE	2:3
ATLD	0:4	PACF	2:4
ATLE	1:1	PACG	3:1
MEDM	1:2	INDA	3:2
PACA	1:3	INDB	3:3
PACB	1:4	INDC	3:4
		INDD	4:1

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COMSEABASEDASWWINGSLANT		1
COMASWWINGPAC		1
CNET		1
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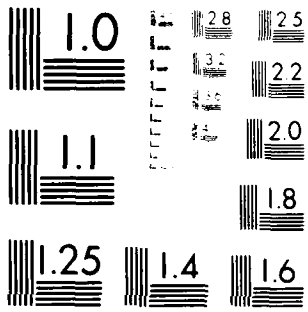
CONT



MICROCOPY RESOLUTION TEST CHART

SUPPLEMENTARY

INFORMATION

DEPARTMENT OF THE NAVY
U.S. NAVAL OCEANOGRAPHIC OFFICE
NSTL STATION
BAY ST. LOUIS, MISSISSIPPI 39522

IN REPLY REFER TO
Code 9200
05 November 1982

CHANGE No. 1

Reference Publication RP-24 Volume I, "Program Operating Procedures for the Integrated Command ASW Prediction System (ICAPS)," June 1981, should be updated as indicated below:

1. Replace page v, "Change Record."

2. Replace Chapter 5, "Profile Generator (PROFGEN) Model," pages 5-1 through 5-14.

3. Add Chapter 7, "Oceanic Data Analysis (ODA) Package," pages 7-1 through 7-24.

4. Replace Chapter 17, "Towed Array Prediction System (TAPS) Model," pages 17-1 through 17-27.

Enclosures

CHANGE RECORD

Change or Correction Number	Date of Change	Date Entered	By Whom	Reason for Change
	Apr 79			Original issue
Revision A	Jun 81			This document reflects changes to over 50 percent of the previous issue. Thus, in accordance with MIL-STD-490, it shall be considered a complete revision, Revision A. Symbols are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.
Change 1	Nov 82			Includes updates and corrections to reflect ICAPS software changes 2 and 3

5.0 PROFILE GENERATOR (PROFGEN) MODEL

Program execution events are described in Table 5-1.

File Name: PROFGEN

Function: Merge bathythermograph data with historical temperature and salinity data and convert into a sound speed profile for a given date and location to drive the acoustic models.

Input: Console input includes date, geographical location, locally observed BT with up to 30 depth/temp. pairs (see ICAPS BT *INPUT form*), and, optionally, the bottom depth, water mass, operator-created name for a save file (see below), and the platform name and time for the ODA data file. The program automatically selects the appropriate Historical Atlas File and if necessary selects the correct TXBT Data File. The required atlas file and TXBT file may reside on either the removable (usually the system device) or the fixed disk. The program automatically searches the "other" disk if the file is not on the system device.

Output: The input parameters, sound speed profile, and sonic layer depth (SLD) are stored in the intermediate work file Z999ICAP:IM and optionally, stored in a save file specified by the operator. Bottom depth and high and low frequency acoustic bottom types retrieved from the historical files are also stored in the intermediate work file. PROFGEN displays the observed BT trace, the merge of historic and locally observed data, and the sound speed profile. These appear in both tabular and graphic forms. Optionally, the BT data may be added to the ODA data file.

Classification: Output displays coupling geographic location with acoustic bottom type are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, Naval Security Regulations.

Historical Data Files: The historical data from each ocean basin are divided into regions. There is a file for each region referenced by a unique file name. These file names are constructed as follows:

OCEAN	REGION	SEASON (for all oceans)
ATLantic (5 regions)	A-E	WINter (Jan - Mar)
PACific (7 regions)	A-G	SPRing (Apr - Jun)
INDian (4 regions)	A-D	SUMmer (Jul - Sep)
MEDiterranean (1 region)	M	FALl (Oct - Dec)

Characters 1-3 define the ocean. Character 4 denotes the region (refer to Figures 5-1 to 5-3). Characters 5-7 define the season. For example, file name ATLASUM is ATLantic Ocean, Region A, SUMmer season.

TXBT Data Files:

A unique TXBT data file exists for each ocean region referenced in the above description of the Historical Data Files. The naming convention is as follows: Characters 1-3 define the ocean. Character 4 denotes the region. Characters 5-7 indicate that TXBT data is used. For example, PACAXBT refers to the Pacific Ocean, Region A, TXBT data file.

File Error Conditions:

If the message ATLAS SOUGHT NOT ON SYSTEM PLATTER appears, or NO ICAPS HISTORICAL ATLAS EXISTS FOR THIS POSITION the program terminates. The file sought is named and may be transferred from another platter or tape. A QANTEX tape containing all of the ICAPS historical atlases is provided to each site at system installation time. The required atlas file(s) may be transferred from tape to the system platter for execution. The tape cannot be used for PROFGEN execution.

Detailed Water Mass Information:

In areas of multiple water masses, a precise definition of each water mass is obtained by responding YES at event No. 18. The display is in metric units. The following definitions apply to the terms which appear:

T_{200} - Temperature (Celsius) at 200 meters

GL - Temperature gradient between 200 and 300 meters

$MINT_{200}$ - Minimum value of T_{200} for the water mass

$MAXT_{200}$ - Maximum value of T_{200} for the water mass

MINGL - Minimum GL for the water mass

MAXGL - Maximum GL for the water mass

Automatic Water Mass Selection:

When several water masses exist in an area, one is automatically selected by the program. Input of locally observed BT data allows water mass selection on the basis of T_{200} and GL values. The operator has the option to select another water mass at Event No. 21.

In the absence of a BT, water mass selection is based on order of occurrence values which define the anticipated sequence of the probable water masses in each one-degree square within an ICAPS region. The program selects the

water mass most likely to occur in the one-degree square. The operator may select an alternate water mass in Event No. 14.

Without BT or TXBT data, the program selects the first water mass in the file. The operator may choose another water mass at Event No. 21.

Save File: BT data stored by PROFGEN in file Z999ICAP:IM is used by successor programs (FACT, SHARPS, etc.), but is destroyed by a subsequent execution of PROFGEN or entering a sound speed or temperature/salinity profile in GENRAYT. The data may be saved for future use by automatically storing them in another user specified file. This option appears in Event No. 24. The suffix ":PR" completes the save-file name; references to the file outside of PROFGEN must include this designator.

Operator Interface: The conversational format and operating sequence in Table 5-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: Immediate.

ICAPS BT INPUT

DAY/MONTH/YEAR ________________

TIME ________________

DATA UNITS ________________

LAT ________________

LONG ________________

BTM DEPTH ________________

	DEPTH	TEMPERATURE		DEPTH	TEMPERATURE
1.			16.		
2.			17.		
3.			18.		
4.			19.		
5.			20.		
6.			21.		
7.			22.		
8.			23.		
9.			24.		
10.			25.		
11.			26.		
12.			27.		
13.			28.		
14.			29.		
15.			30.		

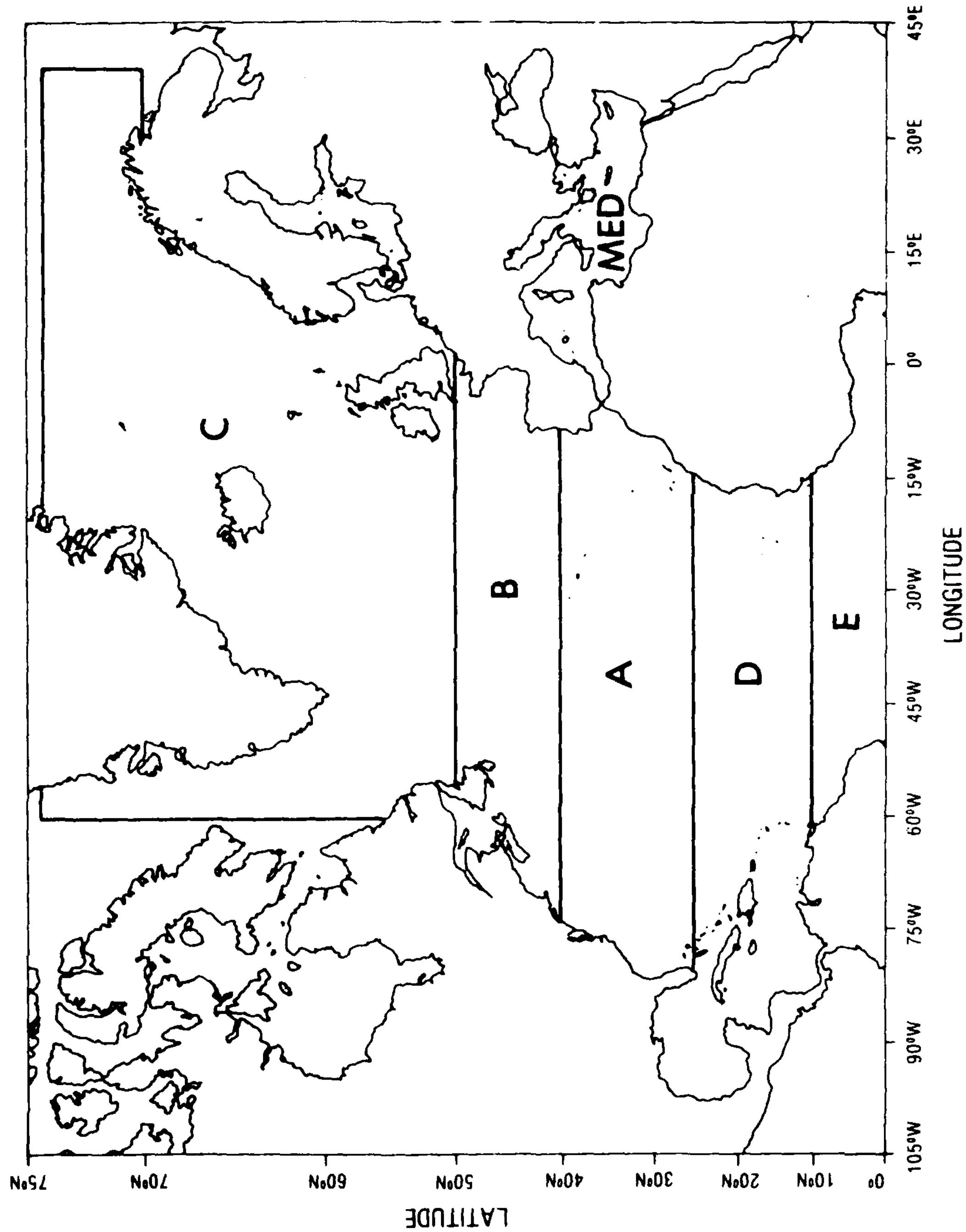


Figure 5-1. North Atlantic Ocean/Mediterranean Sea Locator Chart

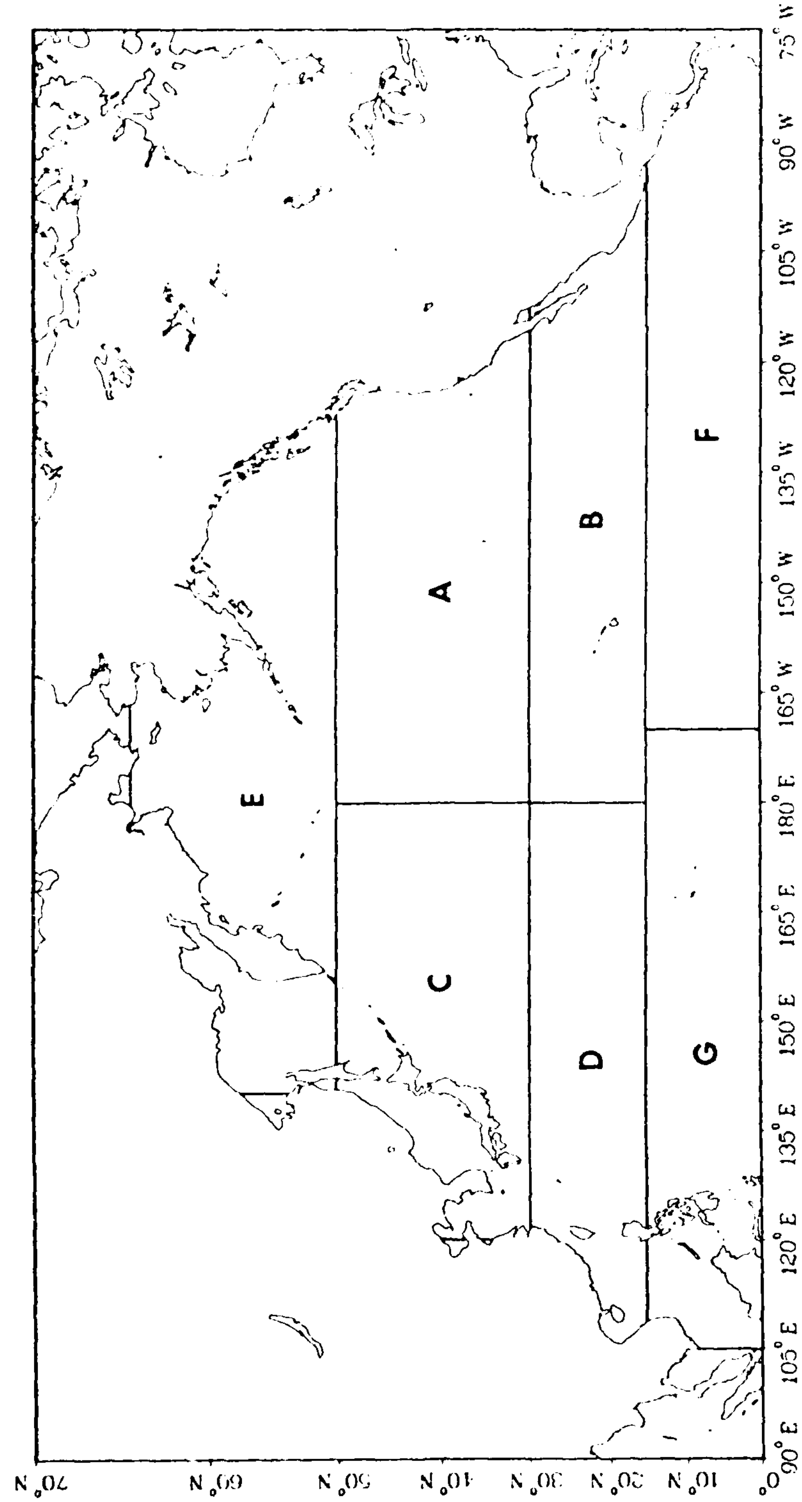


Figure 5-2. North Pacific Ocean Locator Chart.

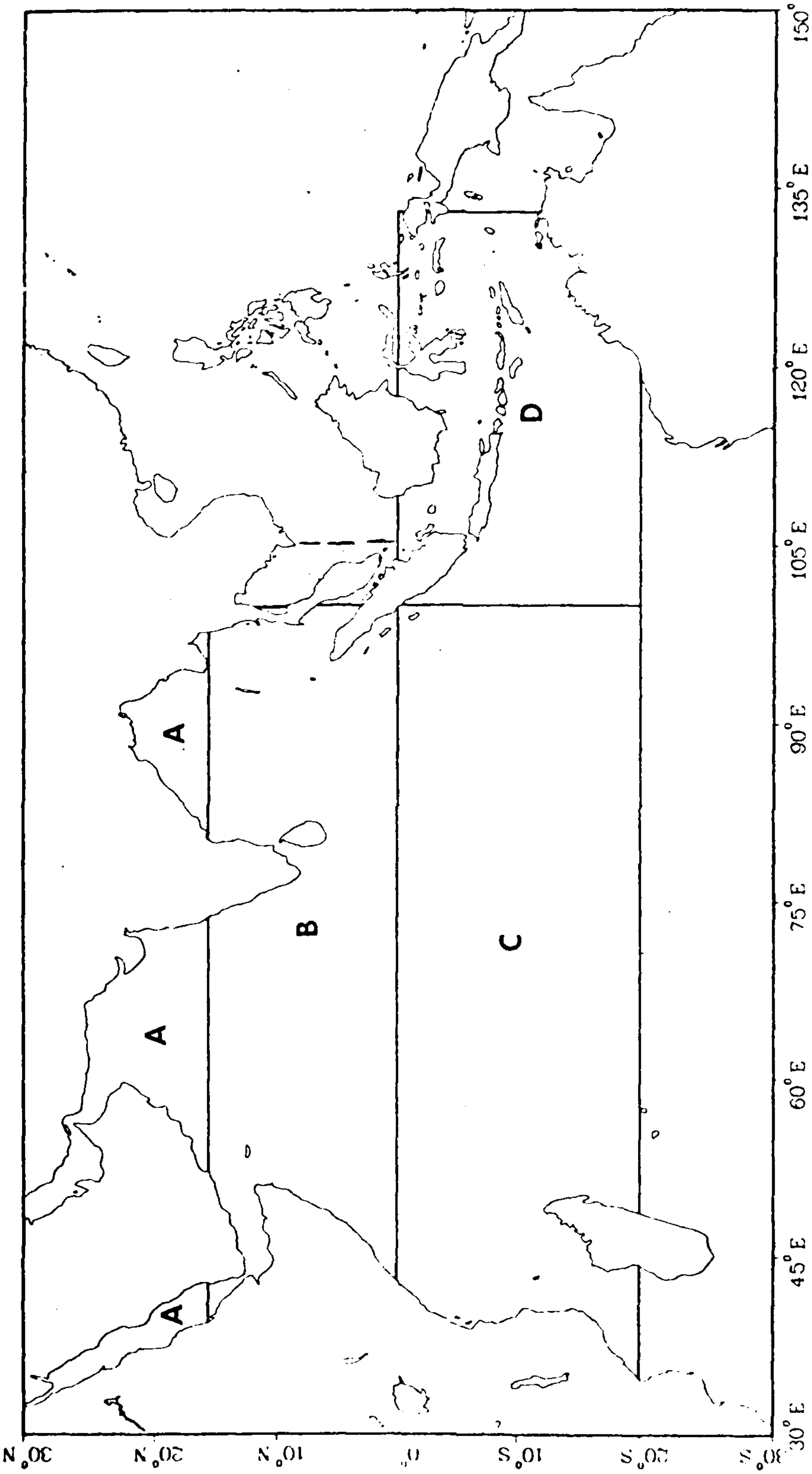


Figure 5-3. Indian Ocean Locator Chart.

TABLE 5-1. PROFGEN PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R PROFGEN Enter and press RETURN.	Initiates PROFGEN program.
2	CRT OPR	**ICAPS PROFILE GENERATOR PROGRAM** IS THIS A NEW RUN OR A RE DISPLAY? 0 FOR REDISPLAY, 1 FOR NEW RUN. Enter 0 or 1 and RETURN.	Redisplay is an option for graphics from a previous PROFGEN run. If 1, processing continues at event #5.
3	CRT OPR	DO YOU WANT RERUN DATA TO COME FROM 1 - Z999ICAP:IM, OR 2 - A:PR FILE? Enter 1 or 2 and RETURN.	If 1, processing continues at event #10 for input BT data, at event #13 for TXBT data, or at event #17 for historical data.
4	CRT OPR	NAME FILE FOR BT INPUT (1 TO 8 CHARACTERS)? = Type in file name and RETURN.	Enter file name only; extension ":PR" is automatically provided. Processing continues at event #10 for input BT data, at event #13 for TXBT data, or at event #17 for historical data.
5	CRT	DAY = MONTH = YEAR = LATITUDE = NORTH (1) SOUTH (2) = LONGITUDE = EAST (1) WEST (2) =	After each "=" sign, operator must insert value, then press RETURN key. Enter day, month, and year as one or two digit numbers. Enter latitude as a four digit number (DDMM) and longitude in five digits (DDDMM).

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
6	CRT	FILE XXXXX SELECTED. BT FROM KEYBOARD (1 = YES, 0 = NO)?	Name of atlas file corresponding to area specified in event #5.
	OPR	Enter 1 or 0 and RETURN.	If response is 0 (NO) processing continues at event #13 if there is TXBT data or at event #17 if TXBT data does not exist for the location.
7	CRT	NUMBER OF DATA POINTS IN PROFILE =	Maximum number of data points = 30.
	OPR	Enter number 2-30 and RETURN.	Minimum number of data points = 2.
8	CRT	UNITS OF DATA = (1 = METRIC, 2 = ENGLISH)?	
	OPR	Enter 1 or 2 and RETURN.	
9	CRT	INPUT PROFILE DATA IN DEPTH TEMPERTURE PAIRS.	Enter as many pairs of depth and temperature values as number of data points (event #7) in the appropriate units (event #8). After last entry program pauses, bell rings. Press LF for hard copy or RETURN.
	OPR	Enter (depth value), (temp. value) and RETURN.	

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
10	CRT OPR	BT DATA INPUT DO YOU WISH TO CHANGE ANY OF THE XX DEPTH TEMPERATURE PAIRS (1 = YES, 0 = NO)? Enter 0 or 1 and RETURN.	BT profile data is displayed in tabular and graphic form for operator inspection. If 0 (NO), processing continues at event #18 for new runs, at event #26 for redisplays in areas with only one water mass, or at event #19 for redisplays in areas with multiple water masses.
11	CRT OPR	CORRECTION - INPUT LINE # AND DEPTH TEMP PAIR. EXAMPLE - 3, 100, 15. DELETION - INPUT LINE # AND TWO ZEROES. EXAMPLE - 5, 0, 0. INSERTION - INPUT DECIMAL LINE # AND DEPTH TEMP PAIR. EXAMPLE - 2.1, 97, 15. INPUT NUMBER OF LINES TO BE CORRECTED. Enter number and RETURN.	Number of lines to be corrected must include all corrections, deletions, and insertions. (Points may be added to the end of the profile in the same manner that an existing point is corrected.)
12	CRT OPR	INPUT LINE NUMBER AND DEPTH-TEMPERATURE PAIRS. Enter (line #), (depth), (temp.) and RETURN.	Input line numbers sequentially when there are multiple insertions or deletions. Line numbers change as corrections are made. The input line number indicates the position in the corrected profile. After the last correction, processing continues at event #10.
13	CRT	NO BT ENTERED: TXBT DATA TO BE USED.	The frequency, water mass number, and name is displayed for each water mass. If there is only one water mass in the area, processing continues at event #16.

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
14	CRT	WATER MASS = X SELECTED BY PROGRAM. ENTER ALTERNATE CHOICE OR 0 TO RETAIN:	Processing continues at event #15 if TXBT data is unavailable for the selected water mass. If TXBT data is available, processing continues at event #16.
	OPR	Enter choice and RETURN.	
15	CRT	SELECTED PROFILE NOT AVAILABLE, ENTER ALTERNATE OR 0 FOR HISTORICAL:	Event repeats until user selects a profile that has TXBT data present or selects historical data by entering 0. If response is 0, processing continues at event #22.
	OPR	Enter alternate choice or 0 and RETURN.	
16	CRT	RETRIEVED BT.	Water mass name and month are displayed. BT profile data is displayed in tabular and graphic form. If this is a redisplay, processing continues at event #26. Otherwise, processing continues at event #22.
17	CRT	TXBT DATA NOT AVAILABLE FOR THIS LOCATION.	Processing continues at event #19.
18	CRT	DO YOU WANT DETAILED WATER MASS INFO FROM RETREV (1 = YES, 0 = NO)? =	If response is 0 (NO), processing continues at event #22.
	OPR	Enter 1 or 0 and RETURN.	If hardcopy desired, press LF, otherwise press RETURN.
19	CRT	WATER MASS X SELECTED BY PROGRAM.	If only one water mass in area, processing continues at event #22.

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
20	CRT	DO YOU WISH TO SPECIFY A WATER MASS OTHER THAN THE ONE SELECTED BY PROGRAM (1 = YES, 0 = NO)?	If response is 0 (NO), processing continues at event #22.
	OPR	Enter 1 or 0 and RETURN.	
21	CRT	SPECIFY ONE BY NUMBER FROM THOSE LISTED ABOVE. =	Enter the number of the water mass desired for this run.
	OPR	Enter line number of desired water mass and RETURN.	
22	CRT	BOTTOM DEPTH XXXX ACCESSED FROM FILES. DO YOU WISH TO CHANGE BOTTOM DEPTH FROM XXXX METERS (1 = YES, 0 = NO)? =	If response is 0 (NO), processing continues at event #24.
	OPR	Enter 1 or 0 and RETURN.	
23	CRT	INPUT NEW BOTTOM DEPTH (METERS)? =	
	OPR	Enter bottom depth and RETURN.	
24	CRT	DO YOU WISH TO SAVE THE SOUND VELOCITY PROFILE IN ANOTHER FILE IN ADDITION TO SYSTEM FILE Z999ICAP:IM (1 = YES, 0 = NO)? =	If 0 (NO) processing continues at event #26.
	OPR	Enter 1 or 0 and RETURN.	
25	CRT	NAME OF FILE (1 TO 8 CHARACTERS)? =	
	OPR	Type in file name and RETURN.	

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
26	CRT	**ENVIRONMENTAL PROFILE DATA**	Display of BT, retrieved, and merged data in tabular form.
	OPR	Press RETURN.	When bell rings press LF for hard copy or RETURN.
27	CRT	***ENVIRONMENTAL PROFILE DATA***	Graphics of BT and historical, merged, and total profile data.
	OPR	Press RETURN.	When bell rings press LF for hard copy or RETURN.
28	CRT	SOUND VELOCITY PROFILE	Graphic and tabular display of the Sound Velocity Profile.
	OPR	Press RETURN.	When bell rings press LF for hard copy or RETURN.
29	CRT	ADD BT TO ODA FILE (1 = YES, 0 = NO)?	If 0 (NO) processing continues at event #33. If 1 (YES), BT is stored in the ODA data file for use in that program. BT's added through PROFGEN become available for analysis in ODA.
	OPR	Enter 0 or 1 and RETURN.	
30	CRT	INPUT PLATFORM NAME?	Platform name must begin with "A" or "S" and have a maximum of six characters. A = Aircraft. S = Ship.
	OPR	Enter name and RETURN.	
31	CRT	INPUT TIME (HHMM):	
	OPR	Enter time and RETURN.	

TABLE 5-1. PROFGEN PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
32	CRT	BT ADDITION TO ODA FILE COMPLETED.	
33	CRT	STOP.	

7.0 OCEANIC DATA ANALYSIS (ODA) PACKAGE

The Oceanic Data Analysis (ODA) package is a tool for synoptic analysis of ocean thermal structure and acoustic properties. Environmental data is entered into the ICAPS profile generator model, PROFGEN, which merges the input BT data with a historical surface to bottom depth/temperature/salinity trace. Appropriate information is then transferred to the ODA data file in a predesignated format. The ODA analysis techniques can be divided into four main categories on the basis of: 1) temperature, 2) sound speed, 3) depth, and 4) gradient.

Prior to any oceanographic analysis, the operator must define an area of interest. This definition requires specifying a minimum and maximum latitude and longitude. The smallest possible definition is a 2° by 2° square; the largest, a 20° by 20° square.

The basic processing accomplished in this model involves the retrieval of BT's from the ODA data file and the assignment of index numbers to these BT's in the order of retrieval. Regardless of the criteria for retrieval, the position of each retrieved BT on the areal grid is calculated, along with the time period between the earliest and most recent of the observations. If the resultant time period is greater than 90 days, no analysis can be performed.

The operator directs the analysis effort through an option list. Temperature and sound speed analysis may be performed on either the BT trace or the total merged profile. Depth analyses are comprised of sonic layer depth, depth surface, deep sound channel, and convergence zone parameters' analyses. Gradient analysis encompasses in-layer and below layer gradients, temperature gradient and temperature difference requiring depth specifications, and depth difference requiring temperature specifications.

The maximum size of the ODA data file is fixed at 304 records, but capability exists to archive observations from the file to an off-line storage media. This off-line storage media is a data cartridge. The operator ultimately decides which observations should be archived, but safeguards built into the ODA package encourage the maintenance of only recent data for use in analysis.

The operator may delete observations from the ODA data file at any time without using the archive procedure. Selection by the operator is on the basis of index number or parameters (location, time, platform). This selection procedure is required for both archival and deletion. Once the operator is satisifed with the deletion set, the observations are deleted from the data file. Observations may also be restored to the intermediate work file for single records only.

Two utility programs for ODA exist, a file packing program and a file restoration program. The file packing program restores the ODA data file to 100% effectiveness. The file restoration program restores a single BT record from archive on tape to the ODA data file.

The ODA package is designed in an iterative fashion which permits cycling through any of the four major functions until the operator decides to terminate the processing.

7.1 OCEANIC DATA ANALYSIS (ODA) MODEL

Program execution events are described in Table 7-1.

File Name: ODA

Function: Synoptic analysis of ocean thermal structure and acoustic properties from multiple bathythermograph data.

Input: Console input is comprised of operator selection from option lists, latitudes and longitudes of the analysis area, depth and temperature values.

Output: Tabular output, point plots and profile traces are displayed for temperature, sound speed, depth and gradient. Listing of all BTs selected and a graphical representation of the analysis area are presented.

Operator Interface: The conversational format and operating sequence in Table 7-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: 5 to 60 seconds.

TABLE 7-1. ODA PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R ODA Enter and press RETURN.	Initiate program ODA
2	CRT	OCEANIC DATA ANALYSIS PACKAGE OPTION LIST 1. DEFINE ANALYSIS AREA 2. SELECT BTS FOR ANALYSIS 3. SELECT ANALYSIS/DISPLAY TECHNIQUE 4. ARCHIVE/DELETE RECORDS FROM THE ODA DATA FILE 5. TERMINATE THE PROGRAM SELECT COURSE OF ACTION: (The first course of action shoud be to define the analysis area. Then select the BT'S for analysis.)	Displays the list of options available. If response to event #2: = 1, program continues at event #3 = 2, program continues at event #7 = 3, program continues at event #17 = 4, program continues at event #76 = 5, program continues at event #97.
	OPR	Enter number (1 5) and RETURN.	
3		AREA SELECTION	Note: Maximum size is 20° on a side; minimum, 2° on a side.
	CRT	ENTER SOUTHERN LATITUDE (DDMM) + N OR S ENTER NORTHERN LATITUDE (DDMM) + N OR S	Southern & western coordinates are for the lower left corner of the area filter.
	OPR	Enter the latitude followed by N or S and RETURN. Enter the longitude followed by E or W and RETURN.	Latitudes are 2 digit degrees and 2 digit minutes. Longitudes are 3 digit degrees and 2 digit minutes.
	CRT	ENTER WESTERN LONGITUDE (DDDMM) + E OR W ENTER EASTERN LONGITUDE (DDDMM) + E OR W	Northern & eastern coordinates are for the upper right corner of the area filter.
	OPR	Enter the latitude followed by N or S and RETURN. Enter the longitude followed by E or W and RETURN.	

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
	CRT	LAT, LON ( ) LAT, LON ( )	The latitudes and longitudes of the area filter are displayed. A negative value for latitude indicates degrees south and a negative value for longitude indicates degrees west.
	OPR	Enter RETURN.	All BT'S are input from a North Pole vantage point from West through East counterclockwise. If they are incorrect an error message will occur and processing will continue at event #2.
4	CRT	Mercator projection of the analysis area with grid lines drawn in.	Press LF for hard copy or RETURN.
5	CRT	DO YOU WISH TO EXPAND THE LIMITS OF THE MAP? (1 = YES, 0 = NO)	If 1(yes), the map is expanded to fill in entire screen; however, it is no longer a mercator projection.
	OPR	Enter 1 or 0 and RETURN.	
6	CRT	DO YOU WISH TO ELIMINATE THE GRID LINES? (1 = YES, 0 = NO)	If 1 (yes) no grid lines will be drawn on any graphic displays.
	OPR	Enter 1 or 0 and RETURN.	Processing continues at event #2.
7		BT SELECTION	
	CRT	1. REVIEW ALL BT'S IN AREA 2. REVIEW ALL BT'S USING FILTERS 3. SELECT BT'S 4. TERMINATE MODULE CHOOSE COURSE OF ACTION:	*If response to event #7:* = 1, program continues at event #8 = 2, program continues at event #9 = 3, program continues at event #13 = 4, program continues at event #2.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
	OPR	Enter number (1-4) and RETURN.	NOTE: A BT list must have been reviewed before going to option 3.
8	CRT	Lists all applicable BT'S in area.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #7.
9	CRT	DO YOU WANT A PLATFORM FILTER (1 = YES, 0 = NO)	If 0 (no) processing continues at event #11.
	OPR	Enter 1 or 0 and RETURN.	
10	CRT	ENTER PLATFORM NAME OR HIT RETURN TO CONTINUE:	Name of platform must already be present in the file. The list of BT'S that are displayed allows BT'S with any of the platform names which are input.
	OPR	Enter name of platform BT and RETURN.	NOTE: More than one platform name may be specified and BT'S with those names will be chosen.
11	CRT	DO YOU WANT A TIME FILTER (1 = YES, 0 = NO)	If 0 (no) bell rings, press RETURN. Processing continues at event #8.
	OPR	Enter 1 or 0 and RETURN.	
12	CRT	ENTER: START DAY, MONTH, YEAR, AND TIME (HHMM): ENTER: END DAY, MONTH, YEAR, AND TIME (HHMM).	Input day, month, year as two-digit integers.
	OPR	Enter (day), (month), (year), and (time), RETURN.	Input time as two-digit hours and minutes. Press LF for hard copy or RETURN. Processing continues at event #8. If list of BT'S is too long, press CONTROL-D to stop listing.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
13	CRT	IS THE CURRENT LIST OF RECORDS ACCEPTABLE (1 = YES, 0 = NO)	Current list is the last list of BT'S that has been displayed.
	OPR	Enter 1 or 0 and RETURN.	If 1 (yes) processing continues at event #16.
14	CRT	INPUT NUMBER OF RECORDS TO OMIT, OR 0 TO RE-START SELECTION:	If 0 (restart selection) processing continues at event #7.
	OPR	Enter 0 or # of records you wish to omit and RETURN.	
15	CRT	INPUT INDEX#:	
	OPR	Enter index no. of a BT you wish to omit and RETURN.	Repeat this as many times as specified in event #14.
	CRT	Displays amended list of BT'S	Processing continues at event #13.
16	CRT	Displays areal graphic representation of BT'S.	Press RETURN when bell rings for grid lines. Press LF for hard copy or RETURN.
	OPR	Enter RETURN for grid lines option.	Processing continues at event #2.
17		ANALYSIS/DISPLAY SELECTION	
	CRT	1. PERFORM TEMPERATURE ANALYSIS 2. PERFORM SOUND SPEED ANALYSIS 3. PERFORM DEPTH ANALYSIS 4. PERFORM GRADIENT ANALYSIS 5. TERMINATE MODULE CHOOSE COURSE OF ACTION:	Displays the list of analysis options available. If response to event #17: = 1, program continues at event #18 = 2, program continues at event #33 = 3, program continues at event #48 = 4, program continues at event #62
	OPR	Enter number (1-5) and RETURN.	= 5, program continues at event #2.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
18		TEMPERATURE ANALYSIS	Displays the list of temperature analysis options available.
	CRT	1. TEMPERATURE SURFACE 2. SINGLE TEMPERATURE TRACE 3. MULTIPLE TEMPERATURE TRACE 4. TEMPERATURE OVERLAY 5. VERTICAL SECTION 6. TERMINATE ANALYSIS CHOOSE COURSE OF ACTION:	*If response to event #18:* = 1, program continues at event #19 = 2, program continues at event #22 = 3, program continues at event #24 = 4, program continues at event #27 = 5, program continues at event #29 = 6, program continues at event #17.
	OPR	Enter number (1-6) and RETURN.	
19	CRT	SPECIFY DEPTH (TYPE -1 FOR SLD):	Enter depth, in meters, for which temperature analysis is desired. If 0 is input sea surface temperature is displayed.
	OPR	Enter depth or -1 for SLD and RETURN.	
20	CRT	Graphic display of temperature surface in degrees C at depth specified.	Press RETURN when bell rings for grid lines. For all point plots, if a point has no value just the point is displayed.
	OPR	Enter RETURN for grid lines option.	Press LF or COPY button for hard copy and RETURN.
21	CRT	Tabular listing of temperature surface in degrees C at specified depth.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN	Processing continues at event #18.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
22	CRT	INPUT 1 FOR BT OR 2 FOR TOTAL PROFILE:	Input 1 produces a BT temp. profile.
	OPR	Enter 1 or 2 and RETURN.	Input 2 produces a total temp. profile.
	CRT	INPUT INDEX NUMBER	Input the index number of the BT for which temperature trace is desired.
	OPR	Enter index number of profile and RETURN.	
23	CRT	Graphic display of BT or total temp. profile versus depth. Includes a tabular listing of depth-temp. pairs.	Press LF for hard copy or RETURN
	OPR	Enter RETURN.	Processing continues at event #18.
24	CRT	INPUT 1 FOR BT OR 2 FOR TOTAL PROFILE:	Input 1 produces a multiple BT temperature profile.
	OPR	Enter 1 or 2 and RETURN.	Input 2 produces a multiple total temperature profile.
	CRT	INPUT NUMBER OF PROFILES (MAX = 10):	Enter number of profiles desired for temperature trace. Maximum number of temperature traces per page is 10. If maximum number of profiles specified, processing continues at event #26.
	OPR	Enter number (1-10) and RETURN.	
25	CRT	INPUT INDEX NUMBER:	Enter index number of profile trace desired. Will continue asking for index number until number of profiles entered in event #24 is satisfied.
	OPR	Enter index number of profile and RETURN.	
26	CRT	Graphic display of Multiple Temperature Profile for BT only or Total Profile versus Depth.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #18.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
			NOTE: BT'S are displayed in numerical order according to their associated index number.
27	CRT	INPUT 1 FOR BT OR 2 FOR TOTAL PROFILE:	Input 1 produces BT overlay. Input 2 produces total overlay.
	OPR	Enter 1 or 2 and RETURN.	
28	CRT	Graphic display of BT or Total Temperature Profile Overlay versus Depth.	Press LF for hardcopy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #18.
29	CRT	Graphic display of the analysis area with BT'S.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN.	Press LF for hard copy or RETURN.
30	CRT	INPUT 1 FOR BT OR 2 FOR TOTAL PROFILE:	
	OPR	Enter 1 or 2 and RETURN.	
		NOTE: A TRACK WILL BE DEFINED BY ENTERING TWO ENDPOINTS.	
	CRT	ENDPOINT 1 IS THE WESTERNMOST OF THE TWO COORDINATE PAIRS. IF THE TRACK IS VERTICAL. ENDPOINT 1 IS THE SOUTHERNMOST OF THE TWO COORDINATE PAIRS.	If no BT'S appear in the area that was defined, then they did not fall within epsilon. The trace area must be redefined.
		ENTER ENDPOINT #1 OF TRACK AS FOLLOWS: LATITUDE (DDMM) + N OR S, LONGITUDE (DDDMM) + E OR W	Epsilon is defined as 1/24 of the largest spatial scale (latitude or longitude).

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
	OPR	Enter the latitude followed by N or S and RETURN. Enter the longitude followed by E or W and RETURN.	
	CRT	ENTER ENDPOINT #2 OF TRACK AS FOLLOWS: LATITUDE (DDMM) + N OR S, LONGITUDE (DDDMM) + E OR W	
	OPR	Enter the latitude followed by N or S and RETURN. Enter the longitude followed by E or W and RETURN.	
31	CRT	Graphic display of the track analysis area showing BT'S in the area.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN.	Press LF for hard copy or RETURN.
32	CRT	Graphic display of the Vertical Section of Temperature Profiles for either BT or Total.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #18.
33		SOUND SPEED ANALYSIS	Displays the list of sound speed analysis options available.
	CRT	1. SOUND SPEED SURFACE 2. SINGLE SOUND SPEED TRACE 3. MULTIPLE SOUND SPEED TRACE 4. SOUND SPEED OVERLAY 5. VERTICAL SECTION 6. TERMINATE ANALYSIS CHOOSE COURSE OF ACTION:	If response to event #33: = 1, program continues at event #34 = 2, program continues at event #37 = 3, program continues at event #39 = 4, program continues at event #42 = 5, program continues at event #44
	OPR	Enter number (1-6) and RETURN.	= 6, program continues at event #17.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
34	CRT	SPECIFY DEPTH (TYPE -1 FOR SLD):	Enter depth, in meters, for which a sound speed surface profile is desired. If 0 is entered, sound speed at surface is displayed.
	OPR	Enter depth or -1 for SLD and RETURN.	
35	CRT	Graphic display of the sound speed surface at requested depth.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN for grid lines option.	Press LF for hard copy or RETURN.
36	CRT	Tabular Listing of Sound Speed Surface in meters/second.	Press LF for hardcopy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #33.
37	CRT	INPUT 1 FOR BT OR 2 FOR TOTAL PROFILE:	Input 1 produces a BT sound velocity profile.
	OPR	Enter 1 or 2 and RETURN.	Input 2 produces a Total sound velocity profile.
	CRT	INPUT INDEX NUMBER:	
	OPR	Enter index number of profile and RETURN.	Enter the index number of the BT for which a sound velocity profile is desired.
38	CRT	Graphic display of the Sound Velocity Profile for either BT or Total Profile versus Depth. Includes a tabular listing of depth, velocity pairs.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #33.
39	CRT	INPUT 1 FOR BT OR 2 FOR TOTAL PROFILE:	Input 1 produces a multiple BT sound velocity profile. Input 2 produces a multiple Total sound velocity profile.
	OPR	Enter 1 or 2 and RETURN.	

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
	CRT	INPUT NUMBER OF PROFILES (MAX = 10):	Enter number of profiles desired for sound velocity profile. Maximum number of profiles per page is 10. If maximum number of available profiles is specified, processing continues at event #41.
	OPR	Enter number (1-10) and RETURN.	
40	CRT	INPUT INDEX NUMBER:	Enter the index number of the BT for which a sound velocity profile is desired. Will continue asking for index number until number of profiles entered in event #39 is satisfied.
	OPR	Enter index number of profile and RETURN.	
41	CRT	Graphic display of the Multiple Sound Velocity Profile (BT or Total) versus depth. Lists VMIN, VMAX and M/SEC INTERVAL.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #33.
42	CRT	INPUT 1 FOR BT OR 2 FOR TOTAL PROFILE:	Input 1 produces a sound velocity profile overlay for BT only.
	OPR	Enter 1 or 2 and RETURN.	Input 2 produces a Total sound velocity profile overlay.
43	CRT	Graphic display of either the BT or Total Sound Velocity Profile Overlay in m/sec versus Depth.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #33.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
44	CRT	Graphic display of the analysis area with BT'S.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN.	Press LF for hard copy or RETURN.
45	CRT	INPUT 1 FOR BT OR 2 FOR TOTAL PROFILE:	
	OPR	Enter 1 or 2 and RETURN.	
		NOTE: A TRACK WILL BE DEFINED BY ENTERING TWO ENDPOINTS.	
	CRT	ENDPOINT 1 IS THE WESTERNMOST OF THE TWO COORDINATE PAIRS. IF THE TRACK IS VERTICAL, ENDPOINT 1 IS THE SOUTHERNMOST OF THE TWO COORDINATE PAIRS.	
		ENTER ENDPOINT #1 OF TRACK AS FOLLOWS: LATITUDE (DDMM) + N OR S, LONGITUDE (DDDMM) + E OR W	If no BT'S appear in the area that was defined, then they did not fall within epsilon. The trace area must be redefined.
		ENTER ENDPOINT #2 OF TRACK AS FOLLOWS: LATITUDE (DDMM) + N OR S, LONGITUDE (DDDMM) + E OR W	Epsilon is defined as 1/24 of the largest spatial scale (latitude or longitude).
	OPR	Enter the latitudes followed by N or S and RETURN. Enter the longitudes followed by E or W and RETURN.	
46	CRT	Graphic display of the track analysis area showing BT'S in the area.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN.	Press LF for hard copy or RETURN.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
47	CRT	Graphic display of the Vertical Section of Temperature Profiles for either BT or Total.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #33.
48		DEPTH ANALYSIS	Displays the list of depth analysis options available.
	CRT	1. SONIC LAYER DEPTH 2. DEPTH SURFACE 3. DEEP SOUND CHANNEL AXIS 4. DEEP SOUND CHANNEL WIDTH 5. CRITICAL DEPTH 6. DEPTH EXCESS 7. TERMINATE ANALYSIS CHOOSE COURSE OF ACTION:	If response to event #48: = 1, program continues at event #49 = 2, program continues at event #51 = 3, program continues at event #54 = 4, program continues at event #56 = 5, program continues at event #58 = 6, program continues at event #60
	OPR	Enter number (1-7) and RETURN.	= 7, program continues at event #17.
49	CRT	Graphic display of the sonic layer depth.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN for grid lines option.	Press LF for hard copy or RETURN.
50	CRT	Tabular Listing of Sonic Layer Depth Values in meters.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #48.
51	CRT	SPECIFY TEMPERATURE:	Enter temperature in degrees C for depth surface graph.
	OPR	Enter temperature and RETURN.	

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
52			NOTE: An I after the value means an inversion exists above that depth.
	CRT	Graphic display of the Depth Surface for the temperature specified.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN for grid lines option.	Press LF for hard copy or RETURN.
53	CRT	Tabular Listing of the Depth Surface Values in meters.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #48.
54	CRT	Graphic display of the Deep Sound Channel Axis.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN FOR grid lines option.	Press LF for hard copy or RETURN.
55	CRT	Tabular Listing of the Deep Sound Axis Values in meters.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #48.
56	CRT	Graphic Display of the Deep Sound Channel Thickness	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN for grid lines option.	Press LF for hard copy or RETURN.
57	CRT	Tabular Listing of the Deep Sound Channel Thickness Values, in meters.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #48.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
58	CRT	Graphic display of Critical Depth.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN for grid lines option.	Press LF for hard copy or RETURN.
59	CRT	Tabular Listing of the Critical Depth Values in meters.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #48.
60			NOTE: A zero displayed for depth excess means no depth excess exists.
	CRT	Graphic display of the Depth Excess.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN for grid lines option.	Press LF for hard copy or RETURN.
61	CRT	Tabular Listing of the Depth Excess Values in meters.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #48.
62		GRADIENT ANALYSIS	Displays the list of Gradient Analysis options available.
	CRT	1. IN-LAYER GRADIENT 2. BELOW-LAYER GRADIENT 3. TEMPERATURE GRADIENT 4. TEMPERATURE DIFFERENCE 5. DEPTH DIFFERENCE 6. TERMINATE ANALYSIS CHOOSE COURSE OF ACTION:	If response to event #62: = 1, program continues at event #63 = 2, program continues at event #65 = 3, program continues at event #67 = 4, program continues at event #70 = 5, program continues at event #73
	OPR	Enter number (1-6) and RETURN.	= 6, program continues at event #17.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
63	CRT	Graphic display of the In-Layer Gradient.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN for grid lines option.	Press LF for hard copy or RETURN.
64	CRT	Tabular Listing of the In-Layer Gradient Values.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #62.
65	CRT	Graphic Display of the Below-Layer Gradient.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN for grid lines option.	Press LF for hard copy or RETURN.
66	CRT	Tabular Listing of the Below-Layer Gradient Values.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #62.
67	CRT	SPECIFY DEPTH, DEPTH (SHALLOW DEPTH FIRST):	Input depth in meters.
	OPR	Enter two depths and RETURN.	
68	CRT	Graphic display of the Temperature Gradient between the two specified depths.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN.	Press LF for hard copy or RETURN.
69	CRT	Tabular Listing of the Temperature Gradient Values between the two specified depths.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #62.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
70	CRT	SPECIFY DEPTH, DEPTH (SHALLOW DEPTH FIRST):	Input depth in meters.
	OPR	Enter two depths and RETURN.	
71	CRT	Graphic Display of the Temperature Difference between the two specified depths.	Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN.	Press LF for hard copy or RETURN.
72	CRT	Tabular Listing of the Temperature Difference Values between the two specified depths.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #62.
73	CRT	SPECIFY HIGH TEMP, LOW TEMP:	Input temperature in degrees C.
	OPR	Enter two temperatures and RETURN.	
74	CRT	Graphic Display of the Depth Difference between the two specified temperatures.	NOTE: An I after the value indicates an inversion. Check depth surface plot for upper depth value. Press RETURN when bell rings for grid lines.
	OPR	Enter RETURN.	Press LF for hard copy or RETURN.
75	CRT	Tabular Listing of the Depth Difference Values between the two specified temperatures.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues at event #62.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
76	CRT OPR	FILE MAINTENANCE MODULE AT THIS POINT YOU MUST SELECT A LIST OF BT'S. THIS LIST CAN BE ARCHIVED AND/OR DELETED. Enter RETURN.	
77	CRT OPR	OPTIONS 1. CHOOSE BT LIST 2. ARCHIVE 3. DELETE 4. RESTORE A BT TO Z999ICAP:IM 5. TERMINATE MODULE CHOOSE OPTION: Enter number (1-5) and RETURN.	Displays the list of file maintenance options available. If response to event #77: = 1, program continues at event #78 = 2, program continues at event #92 = 3, program continues at event #95 = 4, program continues at event #96 = 5, program continues at event #2.
78	 CRT OPR	BT SELECTION FOR ARCHIVAL/ DELETION 1. REVIEW ALL BT'S IN ODA FILE 2. REVIEW ALL BT'S USING FILTERS 3. SELECT BT'S 4. TERMINATE MODULE CHOOSE COURSE OF ACTION: Enter number (1-4) and RETURN.	Displays the list of BT selection options available. If response to event #78: = 1, program continues at event #79 = 2, program continues at event #80 = 3, program continues at event #87 = 4, program continues at event #77.
79	CRT OPR	Displays list of all BT'S available. Enter RETURN.	Press LF for hard copy or RETURN. Processing continues at event #78.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
80	CRT	DO YOU WANT AN AREA FILTER (1 = YES, 0 = NO)	If 0 (no) processing continues at event #82.
	OPR	Enter 1 or 0 and RETURN.	
81		AREA SELECTION	
	CRT	ENTER SOUTHERN LATITUDE (DDMM) + N OR S ENTER NORTHERN LATITUDE (DDMM) + N OR S	Southern & western coordinates are for the lower left corner of the area filter.
	OPR	Enter the latitude followed by N or S and RETURN. Enter the longitude followed by E or W and RETURN.	Latitudes are 2 digit degrees and 2 digit minutes. Longitudes are 3 digit degrees and 2 digit minutes.
	CRT	ENTER WESTERN LONGITUDE (DDDMM) + E OR W ENTER EASTERN LONGITUDE (DDDMM) + E OR W	Northern & eastern coordinates are for the upper right corner of the area filter.
	OPR	Enter the latitude followed by N or S and RETURN. Enter the longitude followed by E or W and RETURN.	
	CRT	LAT, LON ( ) LAT, LON ( )	The latitudes and longitudes of the area filter are displayed.
	OPR	Enter RETURN.	
82	CRT	DO YOU WANT A PLATFORM FILTER (1 = YES, 0 = NO)	If 0 (no) processing continues at event #84.
	OPR	Enter 1 or 0 and RETURN.	
83	CRT	ENTER PLATFORM NAME OR HIT RETURN TO CONTINUE:	Enter the name of an existing platform.
	OPR	Enter platform name and RETURN.	Will continue to ask for platform names until RETURN is entered.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
84	CRT	DO YOU WANT A TIME FILTER (1 = YES, 0 = NO)	If 0 (no) processing continues at event #86.
	OPR	Enter 1 or 0 and RETURN.	
85	CRT	ENTER: START DAY, MONTH, YEAR, AND TIME (HHMM): ENTER: END DAY, MONTH, YEAR, AND TIME (HHMM):	Input day, month and year as two digit integers. Input time as two digit integer hour and two digit integer minutes.
	OPR	Enter (day), (month), (year), (time) and RETURN.	
86	CRT	Tabular Listing of the BT'S chosen from area filter, platform filter, or time filter.	Press LF for hard copy or RETURN.
	OPR	Enter RETURN.	Processing continues a event #78.
87	CRT	FINAL BT LIST SELECTION YOU CAN (1) SELECT BT'S BY SPECIFYING RECORD NUMBERS OR (2) USE PART OR ALL OF THE CURRENT REVIEW LIST. INPUT CHOICE, 1 OR 2:	
	OPR	Enter 1 or 2 and RETURN.	If 2, processing continues at event #89.
88	CRT	INPUT A LIST OF BT'S BY THEIR BT RECORD NUMBERS. WHEN THE LIST IS COMPLETE, INPUT A ZERO. BT # = BT # =	Enter the record number of the desired BT'S.
	OPR	Enter BT record numbers and RETURN. Enter zero when finished and RETURN.	Processing continues at event #77.

TABLE 7-1. ODA PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
89	CRT	Displays the list of BT'S. IS THE CURRENT LIST OF REC-ORDS ACCEPTABLE? (1 = YES, 0 = NO)	
	OPR	Enter 1 or 0 and RETURN.	If 1 (yes) processing contin-ues at event #77.
90	CRT	INPUT # OF RECORDS TO OMIT, OR 0 TO RE-START SELECTION:	
	OPR	Enter number of records to omit or 0 and RETURN	If 0 (re-start selection) pro-cessing continues at event #78.
91	CRT	INPUT INDEX #	Repeat as many times as specified in event #90.
	OPR	Enter BT index number and RETURN.	Processing continues at event #77.
	CRT	Displays new BT list.	
92	CRT	IS THIS A NEW TAPE (1 = YES, 0 = NO)	Input 1 only if tape is new. Then tape is initialized and cleared.
	OPR	Enter 1 or 0 and RETURN.	
	CRT	Displays list of the Tape Directory. DO YOU WANT TO ARCHIVE ON THIS TAPE? (1 = YES, 0 = NO)	Tape must be inserted in Qantex unit prior to specify-ing this option. If tape has not been inserted event #94 occurs.
	OPR	Enter 1 or 0 and RETURN.	If 0 (no) processing contin-ues at event #77.
93	CRT	Displays list of available BT'S. DO YOU WANT TO USE THIS LIST? (1 = YES, 0 = NO)	If 0 (no) no action occurs and processing continues at event #77. Bell rings when archiving complete.
	OPR	Enter 1 or 0 and RETURN.	Processing continues at event #77.

TABLE 7-1. ODA PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
94	CRT	TAPE UNIT NOT READY. PLEASE CHECK.	Processing continues at event #77.
	OPR	Enter RETURN.	
95	CRT	Displays list of available BT'S.	If 0 (no) processing continues at event #77.
		DO YOU WANT TO DELETE THIS LIST? (1 = YES, 0 = NO)	Bell rings when deletion complete.
	OPR	Enter 1 or 0 and RETURN.	Processing continues at event #77.
96	CRT	ENTER LOGICAL RECORD NUMBER OF BT TO RESTORE:	Bell rings when restoration of Z999ICAP:IM is complete.
	OPR	Enter number and RETURN.	Processing continues at event #77.
97	CRT	END OF ODA PROGRAM STOP	Program ends; control returns to XDOS.

7.2 ODA FILE PACKING (ODAPACK)

Program execution events are described in Table 7-2.

File Name: ODAPACK

Function: Packs the ODA Data file thus increasing the effectiveness to 100%. As BT records are deleted the number of records in use versus the number of records allocated decreases. After packing, the number of records in use and the number of records allocated will be equal.

Input: The ODA data file resident on disk.

Output: The ODA data file is packed.

Operator Interface: The conversational format and operating sequence in Table 7-2 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: 20 to 60 seconds.

TABLE 7-2. ODAPACK PROGRAM

Event	Source	Statement/Operator Action	Comment
1	CRT	R ODAPACK	Initiate program ODAPACK.
	OPR	Enter and press RETURN.	
2	CRT	ODA FILE PACKING ROUTINE	
		NUMBER OF RECORDS IN USE = NUMBER OF RECORDS ALLO-CATED = EFFECTIVENESS =	Displays the number of records in use and the number of records allocated. Displays the effectiveness of the file as a percentage.
		DO YOU WANT TO PACK THE FILE (Y OR N)?	
	OPR	Enter Y (yes) or N (no) and RETURN.	If Y (yes) the file is packed.
3	CRT	STOP	Program ends, control returns to XDOS.

7.3 ODA FILE RESTORATION (ODATAPE)

Program execution events are described in Table 7-3.

File Name: ODATAPE

Function: Restores a single BT record from archive on tape to the ODA data file. If the BT record specified for restoration is already resident on the ODA data file, the record will be overwritten. Subsequent records to be restored require individual executions of the program.

Input: Archive tape with BT records.

Output: Restored BT records on the ODA data file.

Operator Interface: The conversational format and operating sequence in Table 7-3 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: 5 minutes.

TABLE 7-3. ODATAPE PROGRAM

Event	Source	Statement/Operator Action	Comment
1	CRT	R ODATAPE	Initiate program ODATAPE.
	OPR	Enter and press RETURN.	
2		TAPE DIRECTORY NUMBER OF FILES (BT'S) PRESENT =	Lists the BT'S available for restoration on the ODA data file.
	CRT	Lists the information for all BT'S present on tape.	
		INPUT BT # TO ADD TO ODA FILE:	
	OPR	Enter BT # and RETURN.	
3	CRT	RECORD NUMBER HAS BEEN FOUND HAVING PLATFORM, POSITION, AND DTG MATCHING THE CURRENT INPUT DATA THIS RECORD WILL BE OVER-WRITTEN.	This message appears if the Record Number specified in event #2 is already resident on the ODA data file.
		BT ADDITION TO ODA FILE COMPLETE	
		STOP	

17.0 TASK FORCE AREA COVERAGE PREDICTION SYSTEM

Program execution events are described in table 17-1.

File Name: TAPS

Function: The TAPS model provides a graphical representation of detection coverage for surface ships equipped with TACTAS (Tactical Towed Array System) AN/SQR-18 or TASS (Towed Array Surveillance System) AN/SQR-15. TAPS is designed for depiction of the coverage of towed array systems in a task force situation. TAPS also provides detection coverage for fields of SSQ-41 and SSQ-41B sonobuoys, as well as counterdection by Soviet submarines carrying the Feniks-M sonar. The model accounts for force acoustic interference and allows threat definitions.

Input: TAPS uses the sound velocity profile in the intermediate file Z999ICAP:IM created by a prior run of PROFGEN or GENRAYT. Threat frequencies are retrieved from a disk file or input from the keyboard. TAPS allows a task force pattern to be defined, using either coordinates or range and bearing from the center of the display. Built into the TAPS model are radiated noise signatures and levels at various speeds for eleven types of Navy ships. For each ship in the task force, the model requires input of the ship type code and speed. Ships may also be assigned either a TASS (S) or a TACTAS (T) sensor array. For each vessel assigned a towed array, the true heading of the ship must be input. The operator must also input target depths and sensor depths for the arrays or sonobuoys. FACT runs are made automatically for the source/receiver depths and the threat frequencies. For each threat frequency, the model allows input of recognition differential (RD); ambient noise (AN) and source level (SL) can be either retrieved or input from the keyboard. Sonobuoy patterns used by the TAPS program are created and modified by program GEOMT. After defining the patterns with program GEOMT, the operator must copy file GEOMT:IM into file Z9GEOMT:IM. It is this second file (Z9GEOMT:IM) from which the patterns used by TAPS are retrieved. Two files are used to allow the operator to maintain separate tactics for use in TAPS from those used in TASDA.

In addition to the above inputs, the model allows use of the force pattern, environmental data and propagation loss curves which were created in the most recent prior run.

Output: The model displays the following for a selected frequency and threat/sensor depth combination:

1. Single sensor towed array or sonobuoy detection coverage.
2. Force detection coverage (probability that at least one sensor detects).
3. Force cross fix detection coverage (probability that at least two sensors detect).
4. Counterdetection coverage by a Soviet target with the Feniks-M sonar.

The model by default displays the 50% probability of detection level. The user may specify one or two other probability levels. TAPS also computes the total area in square nautical miles within the display grid covered by the force sensors at the probability selected.

Classification: Output displays detailing operational capabilities of specific sensors are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, Naval Security Regulations.

Frequency and Depth Selection: TAPS can accept up to five source frequencies and three source/receiver depth pairs. In order to model own force acoustic interference, TAPS also selects a shallow source to match each receiver depth. A FACT run is made for each resulting frequency/depth-pair combination. It is not necessary to run FACT prior to running TAPS, and FACT output from prior runs will not be used in TAPS.

Execution Time:

Propagation Loss calculation	8 minutes each curve
Single towed array detection coverage	1 minute
Sonobuoy field detection coverage	1 minute for each buoy
Force detection coverage	5 minutes plus sonobuoy detection coverage
Force cross-fix detection coverage	5 minutes plus sonobuoy detection coverage

ICAPS TAPS INPUT FORM

(SECRET WHEN FILLED IN)

DATE/TIME ____________________

	OWN FORCE CHARACTERISTICS						
UNIT	SHIP	CODE (1-11)	SPEED (Knts)	POSITION (x, y or Range, Bearing)		SENSOR (T or S)	HEADING (in Degrees)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

	TARGET CHARACTERISTICS			NOISE DATA		
THREAT	CLASS	FREQUENCY	SOURCE LEVEL	RECOGNITION DIFFERENTIAL (t)	RECOGNITION DIFFERENTIAL (s)	AMBIENT NOISE
1		Hz	dB	dB	dB	dB
2		Hz	dB	dB	dB	dB
3		Hz	dB	dB	dB	dB
4		Hz	dB	dB	dB	dB
5		Hz	dB	dB	dB	dB

(SECRET WHEN FILLED IN)

TABLE 17-1. TAPS PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R TAPS	Initiates TAPS program.
		******************************** ICAPS/TAPS ICAPS TACTICAL PREDICTION PROGRAM ********************************	
2	CRT	DO YOU WANT TO USE FORCE UNITS FROM THE LAST TAPS RUN? YES -- INPUT Y NO -- INPUT N:	Recall force and sensor configuration from the last TAPS run. If Y, program continues at event #3; if N, program continues at event #6.
	OPR	Enter Y or N and RETURN.	
3	CRT	DO YOU WANT TO USE THREAT CHARACTERISTICS FROM THE LAST TAPS RUN? YES -- INPUT Y NO -- INPUT N:	Recall threat frequency and source level configuration from last TAPS run. If Y, program continues at event #4; if N, program continues at event #6.
	OPR	Enter Y or N and RETURN.	
4	CRT	DO YOU WANT TO USE SOURCE LEVELS FROM LAST TAPS RUN? YES -- INPUT Y NO -- INPUT N:	Recall ship noise levels at each threat frequency from last TAPS run. If Y, program continues at event #5; if N, program continues at event #6.
	OPR	Enter Y or N and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
5	CRT	DO YOU WANT TO USE THE ENVIRONMENT AND PROPLOSS FROM THE LAST TAPS RUN? YES -- INPUT Y NO -- INPUT N:	Recall the data from the Z999ICAP:IM file, the propagation loss runs and related parameters of the last TAPS run.
	OPR	Enter Y or N and RETURN.	
6	CRT	GRAPHIC DISPLAY OF THE SOUND VELOCITY PROFILE	Lists Latitude, Longitude, Date, and Sound Velocity with graphical display of near-surface and full profile Sound Velocity.
	OPR	Press RETURN.	
7	CRT	CONSULT THE ICAPS MANUAL IF YOU HAVE ANY QUESTIONS YOU MAY STOP THE PROGRAM AND RERUN PROFGEN IF YOU WANT TO. DO YOU WANT TO STOP OR CONTINUE? STOP -- HIT S CONTINUE -- HIT C INPUT S OR C:	If S, program stops; if C, program continues at event #8.
	OPR	Enter S or C and RETURN.	
8	CRT	RUNID: INPUT A RUN OR AREA IDENTIFIER OF UP TO 10 CHARACTERS	Run identifier.
	OPR	Enter up to 10 characters and RETURN.	

TABLE 17-1. TAPS PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
9	CRT	TIME: INPUT THE TIME -- A 4-DIGIT NUMBER (EXAMPLE: 0830):	Time identifier: uniquely identifies current TAPS run. If response to event #5 was Y, program continues at event #11. If N, program continues at event #10.
	OPR	Enter time and RETURN.	
10	CRT	WAVEHEIGHT (FT):	Waveheight in feet: for later use by ambient noise and proploss models.
	OPR	Enter waveheight and RETURN.	
11	CRT	FORCE UNITS UNIT UNIT X Y RANGE No. TYPE (NMI) (NMI) (NMI) BEARING SPEED (DEG) (KTS) DO YOU WANT TO CHANGE THE FORCE? NO -- INPUT N ADD NEW UNIT -- INPUT A MODIFY A UNIT -- INPUT M DELETE A UNIT -- INPUT D INPUT N, A, M, OR D:	List of all units currently in the force with their unit type, position and speed. If there are no units in the force, it is so stated. If N, program continues at event #20; if A, program continues at event #13; if M, program continues at event #12. if D, program continues at event #19.
	OPR	Enter N, A, M, or D and RETURN.	
12	CRT	INPUT THE NUMBER OF THE UNIT YOU WANT TO MODIFY: INPUT UNIT NUMBER (1 TO X):	X is the number of units already entered. Program continues at event #13.
	OPR	Enter number and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
13	CRT	UNIT CHARACTERISTICS FOR UNIT - X xxxxUNIT TYPExxxx 1) FF1097 (MOINESTER CLASS) 2) FF1052 (KNOX CLASS) 3) FF1037 (BRONSTEIN CLASS) FF1040 (GARCIA CLASS) 4) CV (KITTY HAWK CLASS) 5) CG (BELNAP CLASS) 6) DDG (CHARLES ADAMS CLASS) 7) AO (OILER) 8) ADE (FAST COMBAT) 9) AFS (COMBAT STORE) 10) LPH (AMPHIBIOUS ASSAULT) 11) LST (TANK LANDING) 12) ENEMY (COUNTERDETECTION) 13) SBUOY (SONOBUOY FIELD)	X is next unit number to be input.
		INPUT UNIT TYPE (1 TO 13):	If unit type 13 is selected program continues at event #15; otherwise, program continues at event #14.
	OPR	Enter unit type and RETURN.	
14	CRT	INPUT UNIT SPEED FOR UNIT # X (1 TO 30 KNOTS):	Enter speed for ship indicated in event #13. If unit type 12 was selected in event #13, program continues at event #11; otherwise, program continues at event #15.
	OPR	Enter ship speed and RETURN.	

TABLE 17 1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
15	CRT	YOU MAY INPUT POSITION OF UNIT # X AS: (1) X, Y RELATIVE TO ANY (0,0) POINT (2) RANGE AND BEARING RELATIVE TO ANY (0,0) POINT INPUT TYPE OF INPUT (1 OR 2):	Ship position input type. If response is 1, program continues at event #16; if response is 2, program continues at event #17.
	OPR	Enter 1 or 2 and RETURN.	
16	CRT	INPUT X COORDINATE OF UNIT # X (NMI):	Unit position (x and y) in nautical miles.
	OPR	Enter x coordinate and RETURN.	
	CRT	INPUT Y COORDINATE OF UNIT # X (NMI):	If unit type 13 was selected in event #13, program continues at event #18; otherwise, program continues at event #11.
	OPR	Enter y coordinate and RETURN.	
17	CRT	INPUT RANGE OF UNIT # X (NMI):	Unit position (range and azimuth).
	OPR	Enter range and RETURN,	
	CRT	INPUT AZIMUTH OF UNIT # X (0 TO 360 DEG):	If unit type 13 was selected in event #13, program continues at event #18; otherwise, program continues at event #11.
	OPR	Enter azimuth and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
18	CRT	FOR FIELD #A UNIT #B AT POSITION XX YY	A is number of sonobuoy field.
		SELECT SONOBUOY FIELD GEOMETRY:	B is force unit number.
		GEOMETRY FILE CONTENTS	XX is X coordinate in nautical miles.
		TASDA GEOMETRY TACTICS FILE SAMPLE CASE	YY is Y coordinate in nautical miles.
		BUOY GEOMETRY LABELS NO. OF BUOYS	List of Geometry File Contents with field name, # of buoys, min and max spacing to select from.
		SP MIN SP MAX	
		PLEASE SELECT ONE OF THE ABOVE LIST OF X SONOBUOY PATTERNS:	X is the number of patterns listed above.
	OPR	Enter selected pattern number and RETURN.	
	CRT	INPUT BUOY SPACING BETWEEN Y AND Z NAUTICAL MILES:	Y and Z are the limits on spacing for the selected pattern.
	OPR	Enter buoy spacing and RETURN.	
	CRT	INPUT SONOBUOY FIELD ORIENTATION RELATIVE TO NORTH + 180 (CLOCKWISE) TO -180 (COUNTERCLOCKWISE) DEGREES:	Enter field orientation with a + or - preceding the number.
	OPR	Enter rotation and RETURN.	

TABLE [illegible]. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
	CRT	THESE SONOBUOY TYPES ARE AVAILABLE: 1) SSQ 41 60 AND 300 FOOT DEPTH SETTINGS 2) SSQ 41B 60 AND 1000 FOOT DEPTH SETTINGS SELECT 1 OR 2:	Program continues at event #11 if entered from event #16 or #17. Program continues at event #20 if entered from event #24.
	OPR	Enter 1 or 2 and RETURN.	
[illegible]	CRT	INPUT THE NUMBER OF THE UNIT YOU WANT TO DELETE INPUT UNIT NUMBER (1 TO N):	N is the number of units already entered. Program continues [illegible] #[illegible].
	OPR	Enter number and RETURN	
[illegible]	CRT	SENSOR CHARACTERISTICS UNIT NUMBER · UNIT TYPE · SENSOR TYPE · HEADING (DEG) DO YOU WANT TO ADD, MODIFY, OR DELETE A SENSOR? NO · INPUT N ADD A SENSOR · INPUT A MODIFY A SENSOR · INPUT M DELETE A SENSOR · INPUT D INPUT N, A, M, OR D:	List of all [illegible] in force with their number, unit type, [illegible] type and heading. If N, program [illegible] event #26. If A, program continues at event #21. If M, program continues at event #24. If D, program continues at event #25. If there are no sensors in the force one must be added.
	OPR	Enter N, A, M, or D and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
21	CRT	INPUT THE NUMBER OF THE UNIT YOU WANT TO ADD A SENSOR TO INPUT UNIT NUMBER (1 TO X):	X is the number of units in the force. If unit selected is unit type 12 or 13, error message is printed and program continues at event #20; otherwise, program continues at event #22.
	OPR	Enter unit number and RETURN.	
22	CRT	***SONAR TYPE*** 1) TACTAS (AN SQR [illegible]) T 2) TASS (AN SQR [illegible]) S INPUT SENSOR TYPE (T OR S):	
	OPR	Enter T or S and RETURN.	
23	CRT	INPUT TRUE HEADING OF SHIP (0 TO 360 DEG):	Program continues at event #20.
	OPR	Enter heading and RETURN.	
24	CRT	INPUT THE NUMBER OF THE UNIT YOU WANT TO MODIFY SENSOR ON INPUT UNIT NUMBER (1 TO X):	X is the number of units currently in the force If unit selected is unit type 12, an error message is printed, the sensor is not deleted and program continues at event #20; if unit selected is unit type 13, program continues at event #18; otherwise, program continues at event #22.
	OPR	Enter number and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
25	CRT	INPUT THE NUMBER OF THE UNIT YOU WANT TO DELETE THE SENSOR FROM. INPUT UNIT NUMBER (1 TO X):	X is the number of units in the force. If unit selected is unit type 12 or 13, an error message is printed and the sensor is not deleted. Program continues at event #20.
	OPR	Enter unit number and RETURN.	
26	CRT	GRAPHIC DISPLAY OF TACTICAL PREDICTION SYSTEM FORCE AND SENSOR SUMMARY	CRT areal display of force and sensors.
	OPR	Press RETURN.	
27	CRT	DO YOU WANT TO CHANGE THE FORCE UNITS OR SENSORS? YES -- INPUT Y NO -- INPUT N:	Give operator chance to return to beginning of force and/or sensor input process. If Y, program continues at event #11; if N, and no threat signature has been specified yet, program continues at event #28; otherwise, program continues at event #29.
	OPR	Enter Y or N and RETURN.	
28	CRT	NO THREAT FREQUENCIES HAVE BEEN INPUT	Program continues at event #30.
29	CRT	X THREAT FREQUENCIES AND SOURCE LEVELS HAVE BEEN INPUT OR THREAT TYPE Y HAS BEEN SPECIFIED	X is the number of manually input threat signature frequencies. Y is the threat signature type selected.

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
		AND THREAT FREQUENCIES AND SOURCE LEVELS # FREQ (Hz) SL (DB) DO YOU WISH TO CHANGE FREQUENCIES AND SOURCE LEVELS? YES -- INPUT Y NO -- INPUT N:	List of all threat frequencies and source levels. If Y, program continues at event #30; if N, program continues at event #33.
	OPR	Enter Y or N and RETURN.	
30	CRT	DO YOU WISH TO SPECIFY A STANDARD THREAT TYPE? YES -- INPUT Y NO -- INPUT N:	If Y, program continues at event #31; if N, program continues at event #32.
	OPR	Enter Y or N and RETURN.	
31	CRT	****THREAT TYPE***** 1) SOVIET NUCLEAR TYPE 1 2) SOVIET NUCLEAR TYPE 2 3) SOVIET NUCLEAR TYPE 3 4) SOVIET DIESEL TYPE 1 (F, R, W, Z) 5) SOVIET DIESEL TYPE 2 (JULIET) 6) SOVIET DIESEL TYPE 3 (FOXTROT) THREAT TYPE (1-6)=	List of target types from which to choose. Program continues at event #29.
	OPR	Enter selected type number and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
32	CRT	INPUT NUMBER OF FREQUENCIES (1 TO 5):	
	OPR	Enter 1, 2, 3, 4, or 5 and RETURN.	
	CRT	INPUT FREQUENCY (HZ):	
	OPR	Enter frequency and RETURN.	Repeated for the number of frequencies selected.
	CRT	INPUT SOURCE LEVEL (DB):	
	OPR	Enter source level and RETURN.	
33	CRT	DETECTION THRESHOLD (DB) SENSOR TYPE · FREQ (HZ) · DT (DB) DO YOU WANT TO MODIFY DETECTION THRESHOLD FOR ANY OF THE SENSOR TYPES IN THE FORCE? NO -- INPUT N YES -- INPUT SENSOR TYPE (T, S, F, OR B) PLEASE INPUT T, S, F, B, OR N:	List of detection threshold for each useable sensor/frequency combination. If T, S, F, or B program continues at event #34; if N, program continues at event #35. Sensor types are: T - TACTAS (AN/SQR-18) S - TASS (AN/SQR-15) F - FENIKS B - SONOBUOY
	OPR	Enter T, S, F, B, or N and RETURN.	
34	CRT	INPUT DETECTION THRESHOLD FOR SENSOR TYPE Z AT xxx HZ:	Z is sensor type (T, S, F, or B) specified in event #33. Repeat until all useable frequencies are considered. Program continues at event #33.
	OPR	Enter recognition differential and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
35	CRT	DO YOU WANT TO CHANGE THE FORCE UNITS OR SENSORS? YES -- INPUT Y NO -- INPUT N:	Give operator chance to return to beginning of force and/or sensor input process. If Y, program continues at event #11; if N and ambient noise values had previously been selected, program continues at event #38.
	OPR	Enter Y or N and RETURN.	Otherwise, program continues at event #36.
36	CRT	X HZ AMBIENT NOISE IS SET AT Y DB DO YOU WISH TO CHANGE THIS VALUE? NO CHANGE IN VALUE INPUT N CHANGE TO HISTORICAL VALUE -- INPUT H CHANGE TO ESTIMATED VALUE -- INPUT E:	X is the threat frequency. Y is the current value of ambient noise for that frequency. Repeat until all threat frequencies have had the ambient noise value edited. If E, program continues at event #37; if N or H, and all frequencies have been edited, program continues at event #38; otherwise, event repeats.
	OPR	Enter N, H, or E and RETURN.	
37	CRT	AMBIENT NOISE INPUTS ARE YOUR BEST ESTIMATES OF OMNI DIRECTIONAL AMBIENT NOISE IN DB/UPA INPUT AMBIENT NOISE AT X HZ:	If all frequencies have been edited, program continues at event #38; otherwise, program continues at event #36.
	OPR	Enter value and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
38	CRT	AMBIENT NOISE (DB//UPA) # FREQ (HZ) NOISE (DB) DO YOU WANT TO CHANGE YOUR NOISE INPUTS? YES -- INPUT Y NO -- INPUT N:	List of current value of ambient noise for each threat frequency. If Y, program continues at event #36; if N, program continues at event #39.
	OPR	Enter Y or N and RETURN.	
39	CRT	TASK FORCE SOURCE LEVELS UNIT TYPE FREQ SL(DB) SPEED DO YOU WANT TO INPUT NEW SOURCE LEVELS? YES -- INPUT Y NO -- INPUT N:	List of source level at each threat frequency for each ship in the force. If Y, program continues at event #40; if N, and threat depth has been input, program continues at event #41. If no threat depth has been input, program continues at event #43.
	OPR	Enter Y or N and RETURN.	
40	CRT	UNIT NO:	
	OPR	Enter unit number of which you want to change the source level and RETURN.	
	CRT	FREQUENCY NO:	
	OPR	Enter number of frequency from threat frequency list of which you want to change the source level and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
	CRT	SOURCE LEVEL (DB):	Program continues at event #39.
	OPR	Enter new source level in DB for unit and frequency specified above and RETURN.	
41	CRT	THREAT DEPTH = DO YOU WANT TO CHANGE IT? INPUT Y OR N:	Threat depth listed in feet. If Y, program continues at event #44; if N, program continues at event #42.
	OPR	Enter Y or N and RETURN.	
42	CRT	THREAT DEPTH = SOURCE/RECEIVER DEPTH COMBINATIONS PATH # SOURCE (FT) RECEIVER (FT) DO YOU WANT TO CHANGE ANY OF THESE S/R PAIRS? YES -- INPUT Y NO -- INPUT N:	If Y, program continues at event #46; if N, program continues at event #48.
	OPR	Enter Y or N and RETURN.	
43	CRT	NO THREAT DEPTH HAS BEEN INPUT	
44	CRT	INPUT NEW THREAT DEPTH:	Input depth in feet. If counterdetection has not been included in the force selection, program continues at event #46.
	OPR	Enter depth and RETURN.	

TABLE 17 1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
45	CRT	INPUT INITIAL SENSOR DEPTH:	
	OPR	Enter depth and RETURN.	
46	CRT	SOURCE/RECEIVER PAIRS HAVE BEEN GENERATED FOR THREAT AND SONOBUOY FIELDS ARE PART OF THE FORCE FIELD X HAS POSSIBLE SENSOR DEPTHS OF 60 AND Z AND/OR TOWED ARRAY TYPE Y HAS POSSIBLE SENSOR DEPTHS FROM Z1 TO Z2. HOW MANY ADDITIONAL SENSOR DEPTHS DO YOU WANT (0-3)?	If sonobuoys are present in the force, all of the fields will be listed with their possible depth settings 60 and Z (300 or 1000). If towed arrays are present in the force, all will be listed with their type Y, their minimum tow depth Z1 and maximum tow depth Z2. If 0, program continues at event #42; otherwise, program continues at event #47.
	OPR	Enter number of depths and RETURN.	
47	CRT	PATH X ENTER SENSOR DEPTH (FT):	X is the next available S/R pair number. Repeat until all sensor depths indicated in event #46 have been input. Program continues at event #42.
	OPR	Enter depth and RETURN.	
48	CRT	PROPAGATION LOSS INTERMEDIATE FILE BEING WRITTEN	If new FACT runs are required, program continues at event #49; otherwise, program continues at event #50.

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
49	CRT	ICAPS/TAPS IS NOW RUNNING FACT FOR: SOURCE DEPTH = RECEIVER DEPTH = FREQUENCIES (HZ) =	Repeated for each separate source receiver pair. If FACT runs properly, program continues at event #50; if errors are encountered, program continues at event #51.
50	CRT	TAPS CAN PREDICT TOWED ARRAY SENSOR PERFORMANCE FOR THE FOLLOWING DEPTH AND SPEED COMBINATIONS PATH # THREAT DEPTH (FT) RECEIVER DEPTH (FT) SENSOR TYPE X SPEED (KTS) SENSOR TYPE Z SPEED (KTS)	List of ranges of depth and speed for each towed array sensor in use. X and Z are sensor types specified in event #22. Program continues at event #52.
51	CRT	*********************************** MICROSTRUCTURE OF THE SOUND VELOCITY IS TOO COMPLEX FOR FACT TO HANDLE - ICAPS/TAPS WILL HAVE TO BE RESTARTED AFTER ANOTHER PROFILE HAS BEEN GENERATED *********************************** SAFE NOW TO EXIT WITH FACT RESTORED STOP	This error condition indicates that FACT connot process the sound velocity profile in Z999ICAP: IM and that a new one will have to be generated. Program halts.

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
52	CRT	DISPLAY TYPES: (LIST) DISPLAY OPTIONS: (LIST) MODIFY INPUTS: (LIST) PLEASE SELECT ONE OF THE ABOVE OPTIONS (1 TO X):	List of display and processing options. Program continues at event: #53 if selecting single sensor coverage display; #56 if selecting counter-detection coverage display; #59 if selecting force coverage display; #63 if selecting crossfix coverage display; #67 if changing display scale; #68 if changing probability levels; #70 if changing number of beams; #11 if modifying force units or sensors; #29 if modifying threat frequencies and source levels or recognition differentials; #38 if modifying ambient or ship noise levels; #42 if modifying propagation loss source/receiver pairs or target depths; #72 if terminating execution.
	OPR	Enter selection and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
53	CRT	DETECTION COVERAGE DISPLAY OPTIONS FOR SENSOR XN # FREQ. (HZ) THREAT DEPTH (FT) SENSOR DEPTH(FT) WHICH OF THESE CASES DO YOU WISH TO DISPLAY? INPUT NUMBER (1 TO Z):	All possible threat frequency and sensor depth selections are listed. X is sensor type (T, S, F, or B) specified in event #52. N is unit number specified in event #52.
	OPR	Enter selection and RETURN.	
	CRT	DISPLAY FOR SENSOR XN BEING COMPILED.	
54	CRT	ICAPS TACTICAL PREDICTION SYSTEM DETECTION COVERAGE FOR SENSOR XN	X is sensor type. N is unit number. Graphic Display with run identifiers and inputs. Display is complete when the area coverage percentages are printed in the lower left corner and the bell rings. Press LF for hard copy or RETURN.

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
55	CRT	DO YOU WISH TO SEE ANOTHER COVERAGE DISPLAY FOR SENSOR XN? YES -- INPUT Y NO -- INPUT N:	X is sensor type. N is unit number. If Y, program continues at event #53; if N, program continues at event #52.
	OPR	Enter Y or N and RETURN.	
56	CRT	DETECTION COVERAGE DISPLAY OPTIONS FOR SENSOR FN # FREQ. (HZ) THREAT DEPTH (FT) SENSOR DEPTH (FT) WHICH OF THESE CASES DO YOU WISH TO DISPLAY? INPUT NUMBER (1 TO Z):	All possible threat frequencies and sensor depths are listed. F denotes Feniks (counter detection) sensor. N is the counterdetection unit number.
	OPR	Enter selection and RETURN.	
57	CRT	ICAPS TACTICAL PREDICTION SYSTEM COUNTERDETECTION COVERAGE FOR SENSOR FN	N is the counterdetection unit number. Graphic Display with run identifiers and inputs. Display is complete when the area coverage percentages are printed in the lower left corner and the bell rings.

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
			Press LF for hard copy or RETURN.
	OPR	Press RETURN.	
58	CRT	DO YOU WISH TO SEE ANOTHER COVERAGE DISPLAY FOR SENSOR FN? YES -- INPUT Y NO -- INPUT N:	N is the counterdetection unit number. If Y, program continues at event #56; if N, program continues at event #52.
	OPR	Enter Y or N and RETURN.	
59	CRT	FOR THE FORCE COVERAGE DISPLAY DO YOU WISH TO INCLUDE SENSOR XN? YES -- INPUT Y NO -- INPUT N:	X is sensor type. N is unit number. *Repeated for all sensor* units in the force except counterdetection units.
	OPR	Enter Y or N and RETURN.	
60	CRT	DETECTION COVERAGE DISPLAY OPTIONS FOR SENSOR XN: # FREQ. (HZ) THREAT DEPTH (FT) SENSOR DEPTH(FT) WHICH OF THESE CASES DO YOU WISH TO DISPLAY? INPUT NUMBER (1 TO Z):	X is sensor type. N is unit number. All possible threat frequencies and sensor depths are listed. Repeated for all sensors included by operator in event #59.

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
	OPR	Enter selection and RETURN.	
	CRT	DISPLAY FOR SENSOR XN BEING COMPILED.	
61	CRT	ICAPS TACTICAL PREDICTION SYSTEM FORCE DETECTION COVERAGE	Graphic display with run identifiers and inputs. Display is complete when the area coverage percentages are printed in the lower left corner and the bell rings. Press LF for hard copy or RETURN.
	OPR	Press RETURN.	
62	CRT	DO YOU WISH TO SEE ANOTHER FORCE COVERAGE DISPLAY? YES -- INPUT Y NO -- INPUT N:	If Y, program continues at event #59; if N, program continues at event #52.
	OPR	Enter Y or N and RETURN.	
63	CRT	FOR THE CROSSFIX COVERAGE DISPLAY DO YOU WISH TO INCLUDE SENSOR XN? YES -- INPUT Y NO -- INPUT N:	X is sensor type. N is unit number. Repeated for all sensor units in the force except counterdetection units.
	OPR	Enter Y or N and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
64	CRT	DETECTION COVERAGE DISPLAY OPTIONS FOR SENSOR XN: # FREQ. (HZ) THREAT DEPTH (FT) SENSOR DEPTH (FT) WHICH OF THESE CASES DO YOU WISH TO DISPLAY? INPUT NUMBER (1 TO Z):	X is sensor type. N is unit number. All possible threat frequencies and sensor depths are listed. Repeated for all sensors included by operator in event #63.
	OPR	Enter selection and RETURN.	
	CRT	DISPLAY FOR SENSOR XN BEING COMPILED.	
65	CRT	ICAPS TACTICAL PREDICTION SYSTEM CROSSFIX DETECTION COVERAGE	*Graphic Display* with run identifiers and inputs. Display is complete when the area coverage percentages are printed in the lower left corner and the bell rings. Press LF for hard copy or RETURN.
	OPR	Press RETURN.	
66	CRT	DO YOU WISH TO SEE ANOTHER CROSSFIX COVERAGE DISPLAY? YES -- INPUT Y NO -- INPUT N:	If Y, program continues at event #63; if N, program continues at event #52.
	OPR	Enter Y or N and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
67	CRT	DISPLAY SCALE IS CURRENTLY X NMI. PLEASE INPUT NEW DISPLAY SIZE GREATER THAN OR EQUAL TO 10 NMI.	X is current display scale. Program continues at event #52.
	OPR	Enter size (up to 1000) and RETURN.	
68	CRT	DISPLAY PROBABILITY LEVELS CURRENTLY IN EFFECT: X YOU MAY INPUT UP TO 3 NEW PROBABILITY LEVELS. PLEASE INPUT NUMBER OF PROBABILITY LEVELS YOU WANT TO ENTER:	X is list of current probability levels. Enter 1, 2, or 3 probability levels between 0 and 100 percent. Repeats until all indicated levels are entered.
	OPR	Enter 1, 2, or 3 and RETURN.	
	CRT	INPUT PROBABILITY LEVEL #N (0 to 100):	N is the probability level. Repeats until all new probability levels have been entered.
	OPR	Enter level (1 to 100) and RETURN.	
69	CRT	PROBABILITY LEVEL N = SIGNAL LEVEL = SIGMA = DO YOU WANT TO CHANGE SIGMA PLEASE INPUT Y OR N SIGMA =	Lists all new probability levels with signal levels and sigma values at these probability levels. Event repeats until an N is input. Program continues at event #52.
	OPR	Enter new sigma value and RETURN.	

TABLE 17-1. TAPS PROGRAM (continued)

Event	Source	Statement/Operator Action	Comment
70	CRT	NUMBER OF BEAMS AVAILABLE FOR SENSOR TYPE X AND NUMBER OF BEAMS CURRENTLY ASSIGNED: AND ONLY ONE BEAM SETUP TYPE POSSIBLE FOR THIS SENSOR OR DO YOU WANT TO CHANGE ONE OF THE ABOVE BEAM ASSIGNMENTS? YES - INPUT FREQUENCY NUMBER (1 TO Y) NO - INPUT N:	List of number of beams assigned to each possible frequency for sensor type X. Repeated until all sensor types in use have been listed. Y is number of threat frequencies. If frequency number, program continues at event #71; if N, and all sensors in use have been listed, program continues at event #52; otherwise, event repeats.
	OPR	Enter frequency number or N and RETURN.	
71	CRT	INPUT NUMBER OF BEAMS TO BE USED AT X HZ:	Enter new number of beams to be assigned for X frequency level. Program continues at event #70.
	OPR	Enter number of beams and RETURN.	
72	CRT	STOP >>	Program terminates. Control returns to XDOS.

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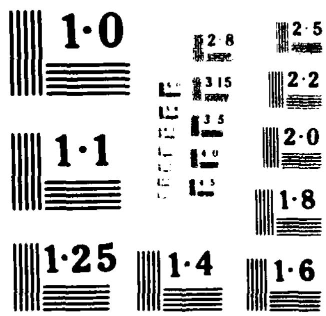
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SUPPLEMENTARY

INFORMATION

AD-A107 558

DEPARTMENT OF THE NAVY

U S NAVAL OCEANOGRAPHIC OFFICE
NSTL STATION
BAY ST LOUIS MISSISSIPPI 39522

IN REPLY REFER TO:
Code 9200
15 Aug 1984

CHANGE No. 2

Reference Publication RP-24 Volume I, ICAPS, "Program Operating Procedures for the Integrated Command ASW Prediction System (ICAPS)," June 1981, should be updated as indicated below.

1. Replace page v, "Change Record."

2. Replace Figure 2-7, "Conceptual Diagram of ICAPS Program Flow," page 2-7.

3. Replace Chapter 5, "Profile Generator (PROFGEN) Model," pages 5-1 through 5-13.

4. Replace Chapter 8, "General Ray Trace (GENRAYT) Model," pages 8-1 through 8-9.

5. Replace Chapter 9, "Fast Asymptotic Coherent Transmission (FACT) Loss Model," pages 9-1 through 9-12.

6. Replace Chapter 13, "Ships Helicopter Acoustic Range Prediction System," pages 13-1 through 13-10.

7. Replace Chapter 20, "Qantex Tape Utilities," pages 20-1 through 20-6.

8. Replace Distribution List.

CHANGE RECORD

Change or Correction Number	Date of Change	Date Entered	By Whom	Reason for Change
	Apr 79			Original issue
Revision A	Jun 81			This document reflects changes to over 50 percent of the previous issue. Thus, in accordance with MIL-STD-490, it shall be considered a complete revision, Revision A. Symbols are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.
Change 1	Nov 82			Includes updates and corrections to reflect ICAPS software changes 2 and 3
Change 2	Aug 84			Includes change to Figure 2-3 and updates and corrections to reflect ICAPS software changes 4 and 5.

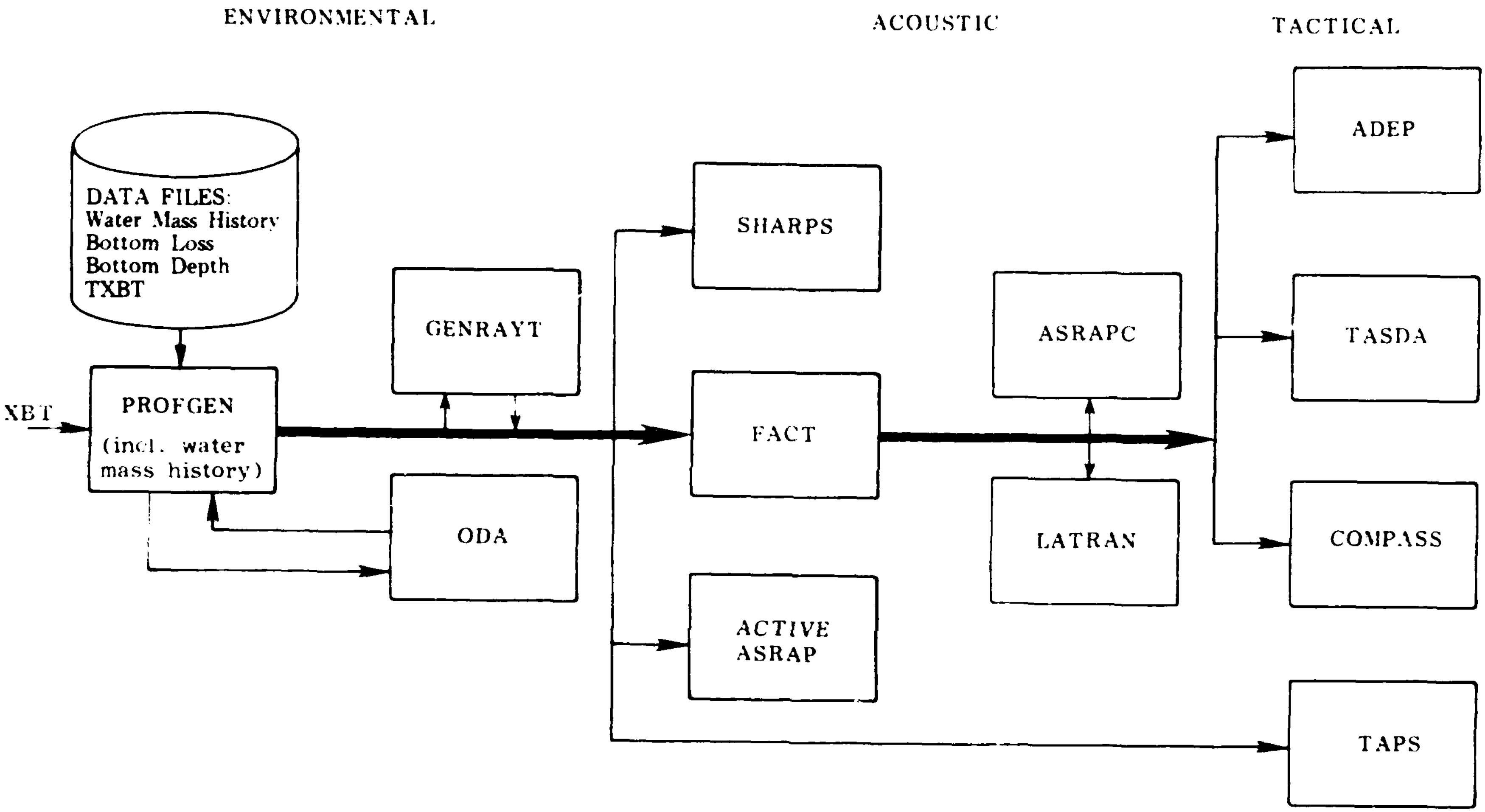

Figure 2-3. Conceptual Diagram of ICAPS Program Flow

limitations, the oceans are divided into areas (Figure 2-4), each consisting of numerous regions (Figure 2-5). Table 2-2 shows water mass information for Atlantic Area A.

Classical water mass theory was used in the determination of the ICAPS water masses. However, the water mass concept used in the ICAPS water mass file does not completely correspond to classical water mass theory. Original oceanographic data supplied the basis for determining the water masses. Two NAVOCEANO data files were used: 1) an oceanographic station data file of approximately 491,000 observations compiled by the National Oceanographic Data Center (NODC) provided temperature and salinity data at each of the (NODC) 32 standard depths between the sea surface and 7,000 m. 2) an XBT file of approximately 218,000 observations compiled from three sources (NAVOCEANO, NODC, and Fleet Numerical Oceanography Center) provided temperature data at each inflection point over the depth range of the instrument (as deep as 760 m).

The water masses were selected and verified using the following procedure: a) oceanographic literature was searched for classical water mass definitions; b) inflection points in the temperature versus salinity (T-S) plot were used to differentiate water masses; c) temperature and salinity gradients were plotted on histograms; d) the ocean station data file supplemented by the XBT data file was used to provide annual composite statistical data within an area; e) mean seasonal temperature and salinity profiles were developed and when necessary extrapolated to the bottom. These profiles were then checked against neighboring profiles for inconsistencies and errors.

In the oceans the greatest variation in temperature and salintiy occurs in the upper waters. The surface layer will often reflect even daily changes. Below the upper waters variations occur more gradually but with noticeable seasonal differences. ICAPS uses seasonal historical profiles to account for the seasonal variation. An on-scene BT which is representative of the actual surface thermal structure is used to replace the top portion of the seasonal historical temperature profile. This results in a surface to bottom historical profile which takes into account short time and seasonal variation in the upper waters. This composite profile reliably represents the actual environmental conditons present at the location where the BT was taken.

An ICAPS water mass is identified by the temperature range at 200 meters (m). Where more than one water mass exists in the same region with the same 200 m temperature range, the temperature gradient between 200 and 300 m is used for differentiation. As many as five water masses may be found in a subarea. Each water mass has a characteristic profile for each of the four seasons.

5.0 PROFILE GENERATOR (PROFGEN) MODEL

Program execution events are described in Table 5-1.

File Name: PROFGEN

Function: Merge bathythermograph data with historical temperature and salinity data and convert into a sound speed profile for a given date and location to drive the acoustic models.

Input: Console input includes date, geographical location, locally observed BT with up to 30 depth/temp. pairs (see ICAPS BT INPUT form, page 5-4), and, optionally, the bottom depth, water mass, operator-created name for a save file (see below), and the platform name and time for the ODA data file. The program automatically selects the appropriate Historical Atlas File and if necessary, selects the correct TXBT Data File. The required atlas file and TXBT file may reside on either the removable (usually the system device) or the fixed disk. The program automatically searches the "other" disk if the file is not on the system device.

Output: The input parameters, sound speed profile, and sonic layer depth (SLD) are stored in the intermediate work file Z999ICAP:IM and optionally, stored in a save file specified by the operator. Bottom depth and high and low frequency acoustic bottom types retrieved from the historical files are also stored in the intermediate work file. PROFGEN displays the observed BT trace, the merge of historic and locally observed data, and the sound speed profile. These appear in both tabular and graphic forms. Optionally, the BT data may be added to the ODA data file.

Classification: Output displays coupling geographic location with acoustic bottom type are classified CONFIDENTIAL. Hard copies of these displays should be makred and handled in accordance with OPNAVINST 5510.1F, DON Information Security Program Regulation.

Historical Data Files: The historical data from each ocean basin are divided into regions. There is a file for each region referenced by a unique file name. These file names are constructed as follows:

OCEAN	REGION	SEASON (for all oceans)
ATLantic (6 regions)	A F	WINter (Jan Mar)
PACific (7 regions)	A G	SPRing (Apr Jun)
INDian (4 regions)	A D	SUMmer (Jul Sep)
MEDiterranean (1 region)	M	FALl (Oct Dec)

Characters 1-3 define the ocean. Character 4 denotes the region (refer to Figure 5-1). Characters 5-7 define the season. For example, file name ATLASUM is ATLantic Ocean, Region A, SUMmer season.

TXBT Data Files: A unique TXBT data file exists for each ocean region referenced in the above description of the Historical Data Files. The naming convention is as follows: Characters 1-3 define the ocean. Character 4 denotes the region. Characters 5-7 indicate that TXBT data is used. For example, PACAXBT refers to the Pacific Ocean, Region A, TXBT data file.

TSEP Data Files: Like the TXBT data files described above, there exists a unique TSEP data file for each region of the Historical Data Files. The naming convention is as follows: Characters 1-3 define the ocean. Character 4 denotes the region. Characters 5-7 indicate that the file contains TSEP data. ATLASEP, refers to the Atlantic Ocean, Region A, TSEP data file.

File Error Conditions: If the message ATLAS SOUGHT NOT ON SYSTEM PLATTER appears, or NO ICAPS HISTORICAL ATLAS EXISTS FOR THIS POSITION the program terminates. The file sought is named and may be transferred from another platter or tape. QANTEX tapes containing all of the ICAPS historical atlases are provided to each site at system installation time. The required atlas file(s) may be transferred from tape to the system platter for execution. These tapes cannot be used for PROFGEN execution.

Detailed Water Mass Information: A definition of each water mass is displayed using the following terms.

T_{200} - Temperature (Celsius) at 200 meters

T_{100} - Temperature (Celsius) at 100 meters (Mediterranean)

GL - Temperature gradient between 200 and 300 meters (or between 100 and 200 meters in the Mediterranean)

$MINT_{200}$ - Minimum value of T_{200} for the water mass

$MINT_{100}$ - Minimum value of T_{100} for the water mass (Mediterranean)

$MAXT_{200}$ - Maximum value of T_{200} for the water mass

$MAXT_{100}$ - Maximum value of T_{100} for the water mass (Mediterranean)

MINGL Minimum GL for the water mass

MAXGL Maximum GL for the water mass

Automatic Water Mass Selection: When several water masses exist in an area, one is automatically selected by the program. Input of locally observed BT data allows water mass selection on the basis of the temperature at the temperature filter depth and the gradient value. The temperature filter depth is 100 meters in the Mediterranean and 200 meters elsewhere. The gradient is found between 100 and 200 meters in the Mediterranean and between 200 and 300 meters elsewhere. The operator has the option to select another water mass at Event No. 23.

In the absence of a BT, water mass selection is based on order of occurrence values which define the anticipated sequence of the probable water masses in each one degree square within an ICAPS region. The program selects the water mass most likely to occur in the one-degree square. The operator may select an alternate water mass in Event No. 21.

Without BT or TXBT data, the program selects the first water mass in the file. The operator may choose another water mass at Event No. 23.

Save File: BT data stored by PROFGEN in file Z999ICAP:IM is used by successor programs (FACT, SHARPS, etc.), but is destroyed by a subsequent execution of PROFGEN or entering a sound speed or temperature/salinity profile in GENRAYT. The data may be saved for future use by automatically storing them in another user specified file. This option appears in Event No. 27. The suffix ":PR" completes the save file name; references to the file outside of PROFGEN must include this designator.

Operator Interface: The conversational format and operating sequence in Table 5-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: Immediate.

ICAPS BT INPUT

DAY/MONTH/YEAR ____________________

TIME ____________________

DATA UNITS ____________________

LAT ____________________

LONG ____________________

BTM DEPTH ____________________

	DEPTH	TEMPERATURE		DEPTH	TEMPERATURE
1.			16.		
2.			17.		
3			18.		
4			19.		
5			20.		
6			21.		
7			22.		
8			23.		
9			24.		
10.			25.		
11			26.		
12.			27		
13			28		
14			29.		
15			30.		

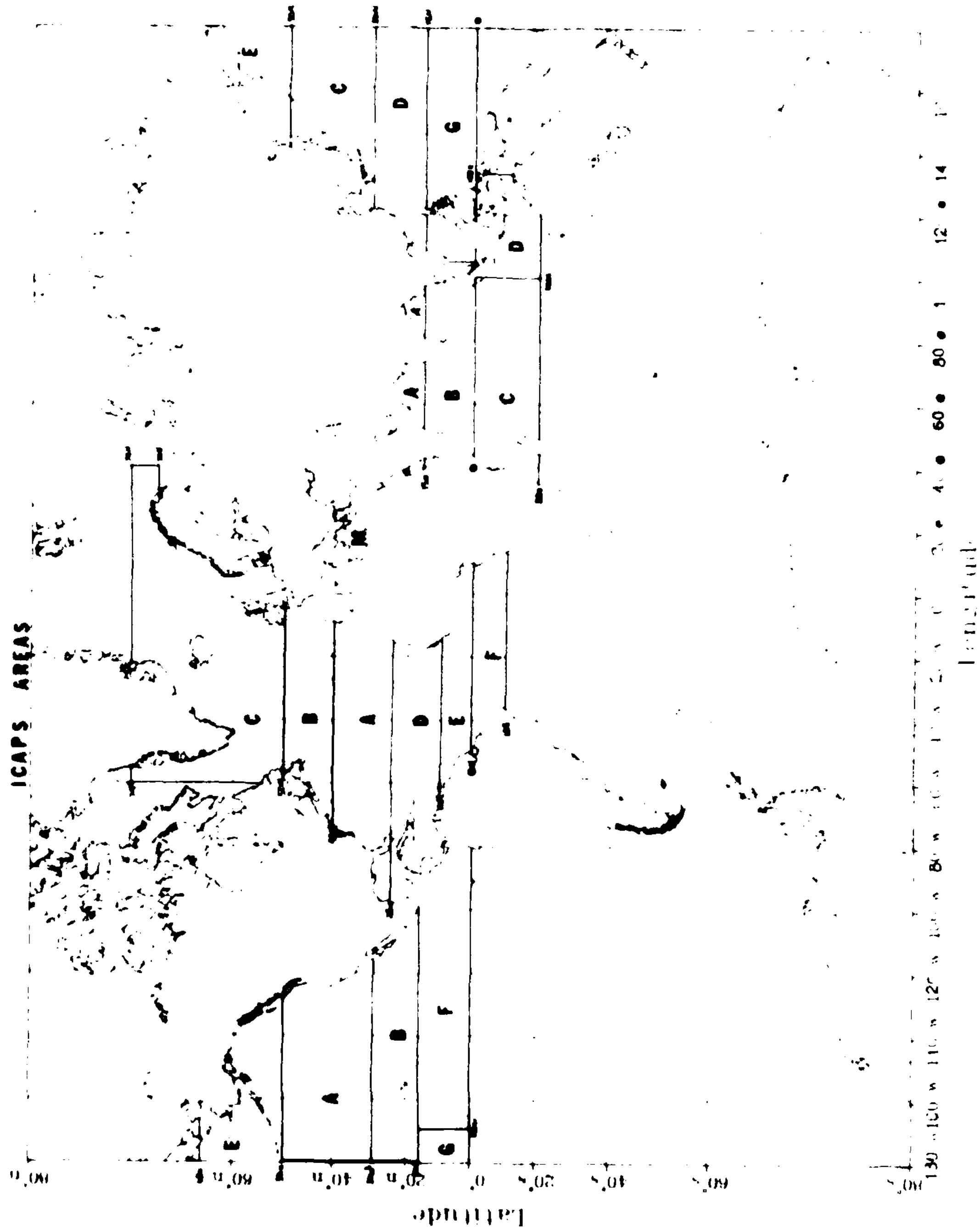

Figure 5 1.

TABLE 5 1. PROFGEN PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R PROFGEN Enter and press RETURN.	Initiates PROFGEN
2	CRT	**ICAPS PROFILE GENERATOR PROGRAM** IS THIS A NEW RUN OR A RE DISPLAY? 0 FOR REDISPLAY, 1 FOR NEW RUN.	
	OPR	Enter 0 or 1 and RETURN.	If 1, processing continues at event #5.
3	CRT	DO YOU WANT RERUN DATA TO COME FROM 1 Z999ICAP:IM, OR 2 A:PR FILE?	If 1, processing continues at event #10 for input BT data or at event #13 for TXBT data.
	OPR	Enter 1 or 2 and RETURN.	
4	CRT	NAME FILE FOR BT INPUT (1 TO 8 CHARACTERS)?	Enter file name only: extension ":PR" is automatically provided.
	OPR	Type in file name and RETURN.	Processing continues at event #10 for input BT data or at event #13 for TXBT data.
5	CRT	DAY MONTH YEAR LATITUDE NORTH (1) SOUTH (2) LONGITUDE EAST (1) WEST (2)	After each "-" sign, operator must insert value, then press RETURN key. Enter day, month, and year as one or two digit numbers. Enter latitude as a four digit number (DDMM) and longitude in five digits (DDDMM).

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
6	CRT	FILE XXXXX SELECTED. BT FROM KEYBOARD (1 = YES, 0 = NO)?	Name of atlas file corresponding to area specified in event #5.
	OPR	Enter 1 or 0 and RETURN.	If response is 0 (NO) processing continues at event #13 if there is TXBT data or at event #15 if TXBT data does not exist for the location.
7	CRT	NUMBER OF DATA POINTS IN PROFILE	Maximum number of data points = 30.
	OPR	Enter number 2-30 and RETURN.	Minimum number of data points = 2.
8	CRT	UNITS OF DATA (1 = METRIC, 2 = ENGLISH)?	
	OPR	Enter 1 or 2 and RETURN.	
9	CRT	INPUT PROFILE DATA IN DEPTH TEMPERTURE PAIRS.	Enter as many pairs of depth and temperature values as number of data points (event #7) in the appropriate units (event #8). After last entry program pauses, bell rings. Press LF for hard copy or RETURN.
	OPR	Enter (depth value), (temp. value) and RETURN.	

TABLE 5 1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
10	CRT	BT DATA INPUT DO YOU WISH TO CHANGE ANY OF THE XX DEPTH TEMPERATURE PAIRS (1 = YES, 0 = NO)?	BT profile data is displayed in tabular and graphic form for operator inspection. If 0 (NO), processing continues at event #16.
	OPR	Enter 0 or 1 and RETURN.	
11	CRT	CORRECTION INPUT LINE # AND DEPTH TEMP PAIR. EXAMPLE 3, 100, 15. DELETION INPUT LINE # AND TWO ZEROES. EXAMPLE 5, 0, 0. INSERTION INPUT DECIMAL LINE # AND DEPTH TEMP PAIR. EXAMPLE 2.1, 97, 15. INPUT NUMBER OF LINES TO BE CORRECTED.	Number of lines to be corrected must include all corrections, deletions, and insertions. (Points may be added to the end of the profile in the same manner that an existing point is corrected.)
	OPR	Enter number and RETURN.	
12	CRT	INPUT LINE NUMBER AND DEPTH TEMPERATURE PAIRS.	Input line numbers sequentially when there are multiple insertions or deletions. Line numbers change as corrections are made. The input line number indicates the position in the corrected profile. After the last correction, processing continues at event #10.
	OPR	Enter (line #), (depth), (temp.) and RETURN.	
13	CRT	NO BT ENTERED; TXBT DATA TO BE USED.	The frequency, water mass number, and name is displayed for each water mass.

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
14	CRT	RETRIEVED BT.	Water mass name and month are displayed. BT profile data is displayed in a tabular and graphic form. Processing continues at event #16 for single water masses or at event #17 for multiple water masses.
15	CRT	TXBT DATA NOT AVAILABLE FOR THIS LOCATION	
16	CRT	WATER MASS # X SELECTED BY PROGRAM.	Minimum and maximum temperatures at the temperature filter depth, and minimum and maximum gradients are displayed for each water mass in the area. If TSEP data is not available processing continues at event #24. If TXBT data is not available processing continues at event #25.
17	CRT	INPUT TSEP ENVELOPE SIZE (50% 95%, 0 DEFAULT = 68%):	
	OPR	Enter percentage (50 95) and RETURN.	Entering 0 defaults to 68%.
18	CRT	STATISTICAL ENVELOPE X% OF OBSERVATIONS	Graphical display of statistical envelope and input BT. If only one water mass in the area, then processing continues at event #25.

TABLE 5 1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
19	CRT	DO YOU WISH TO SPECIFY A WATER MASS OTHER THAN THE ONE SELECTED BY THE PROGRAM (1 - YES, 0 - NO)?-	
	OPR	Enter 0 or 1 and RETURN.	If response is 0, processing continues at event #25 for a new run, at event #29 for redisplay. If response is 1, processing continues at event #23 if BT is input from keyboard, at event #20 if TXBT data is used.
20	CRT	NO BT ENTERED; TXBT DATA TO BE USED.	
21	CRT	WATER MASS #X SELECTED BY PROGRAM. ENTER ALTERNATE CHOICE OR 0TO RETAIN:	The frequency, water mass name and number is displayed for each water mass in the area.
	OPR	Enter choice and RETURN.	Processing continues at event #14 if TXBT data is available for the selected water mass.
22	CRT	SELECTED TXBT NOT AVAILABLE; ENTER 0 FOR HISTORICAL OR ENTER ALTERNATE:	
	OPR	Enter choice and RETURN.	This event repeats until a profile is selected that has TXBT data present, then processing continues at event #14. If response is 0, processing continues at event #25.

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
23	CRT	WATER MASS #X SELECTED BY PROGRAM. SPECIFY ONE BY NUMBER FROM THOSE LISTED ABOVE.	The frequency, water mass name and number is displayed for each water mass in the area.
	OPR	Enter choice and RETURN.	Processing continues at event #17 if TSEP data exists for the selected water mass.
24	CRT	TSEP DATA NOT AVAILABLE	Processing continues at event #19.
25	CRT	BOTTOM DEPTH XXXX ACCESSED FROM FILES. DO YOU WISH TO CHANGE BOTTOM DEPTH FROM XXXX METERS (1 = YES, 0 = NO)?	
	OPR	Enter 1 or 0 and RETURN.	If response is 0 (NO), processing continues at event #27.
26	CRT	INPUT NEW BOTTOM DEPTH (METERS)?	
	OPR	Enter bottom depth and RETURN.	
27	CRT	DO YOU WISH TO SAVE THE SOUND VELOCITY PROFILE IN ANOTHER FILE IN ADDITION TO SYSTEM FILE Z999ICAP:IM (1 = YES, 0 = NO)?	
	OPR	Enter 1 or 0 and RETURN.	If 0 (NO) processing continues at event #29.
28	CRT	NAME OF FILE (1 TO 8 CHARACTERS)?	
	OPR	Type in file name and RETURN.	

TABLE 5-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
29	CRT	**ENVIRONMENTAL PROFILE DATA**	Display of BT, retrieved, and merged data in tabular form.
	OPR	Press RETURN.	When bell rings press LF for hard copy or RETURN.
30	CRT	***ENVIRONMENTAL PROFILE DATA***	Graphics of BT and historical, merged, and total profile data.
	OPR	Press RETURN.	When bell rings press LF for hard copy or RETURN.
31	CRT	SOUND VELOCITY PROFILE	Graphic and tabular display of the Sound Velocity Profile.
	OPR	Press RETURN.	When bell rings press LF for hard copy or RETURN.
32	CRT	ADD BT TO ODA FILE (1 - YES, 0 - NO)?	If 0 (NO) processing continues at event #36. If 1 (YES), BT is stored in the ODA data file for use in that program. BT's added through PROFGEN become available for analysis in ODA.
	OPR	Enter 0 or 1 and RETURN.	
33	CRT	INPUT PLATFORM NAME?	Platform name must begin with "A" or "S" and have a maximum of six characters. A - Aircraft. S - Ship.
	OPR	Enter name and RETURN.	
34	CRT	INPUT TIME (HHMM):	
	OPR	Enter time and RETURN.	

TABLE 5 1. PROFGEN PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
35	CRT	BT ADDITION TO ODA FILE COMPLETED.	
36	CRT	STOP.	End of program.

8.0 GENERAL RAY TRACE (GENRAYT) MODEL

Program execution events are described in Table 8-1.

File Name: GENRAYT

Function: The program generates sound velocity profile (SVP) and/or ray trace graphic displays. SVP data may be input via the console in either engineering or metric units; or alternately, depth, temperature, and salinity values are input and an SVP calculated. In either case, the resultant SVP is written to the intermediate file, Z999ICAP:IM. To generate a ray trace diagram, the existing SVP stored in the intermediate file is utilized. The operator has the option to enter bottom topo graphic data to define a variable depth bottom if desired. GENRAYT assumes a flat bottom in default of a bottom profile.

Input: GENRAYT reads the intermediate file, Z999ICAP:IM. Console input may include data, geographic location, source depth, initial angle, angle increment, number of angles, depression angle, maximum range, minimum range, maximum plotting depth, SVP or temperature, salinity values, and bottom definition.

Output: GENRAYT processes the SVP input and places the result in the file Z999ICAP:IM. SVP and ray trace graphics appear on the screen.

Operator Interface: The conversational format and operating sequence in Table 8-1 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: 10 seconds.

TABLE 8 1. PROFGEN PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R GENRAYT	Initializes program GENRAYT.
2	CRT	SELECT COURSE OF ACTION 1 LONG RANGE RAYTRACE 2 SHORT RANGE RAYTRACE 3 - SVP PLOT 4 = BOTTOM DEFINITION 5 - SVP INPUT 6 = END OF JOB	NOTE: If a new SVP is input via the console (option 3), the information will replace the SVP currently in Z99ICAP:IM.
	OPR	Enter 1, 2, 3, 4, 5, or 6 and press RETURN.	If response is 2, program continues at event #6.
3	CRT	UNITS OF DATA (1 ENGINEERING, 2 = METRIC)	If response to event #2: = 1, program continues at event #4. 3, program continues at event #18. 4, program continues at event #20. 5, program continues at event #25. 6, program continues at event #35.
	OPR	Enter 1 or 2 and RETURN	
4	CRT	MAXIMUM RANGE (KYD,KM) SOURCE DEPTH (FT,M) INITIAL ANGLE ANGLE INCREMENT NUMBER OF ANGLES DEPRESSION ANGLE	
	OPR	Respond to each query as it appears and press RETURN.	Maximum acceptable range is 400 KYD,KM). Enter angles in degrees; negative is upward from the horizontal, positive is downward. Angles should not exceed ±85°. NOTE: Unless a variable hull mounted sonar is used, a zero should be input for depression angle.

TABLE 8-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
5	CRT	Displays RAYTRACE graphic. 'BELL' rings.	
	OPR	Press LF or RETURN.	Program continues at event #2.
6	CRT	PLOTTING DEPTH XXXX FT DO YOU WISH TO CHANGE? (NO-(0),YES-(1)):	Plotting depth is either the deepest depth in the depth array or 2,500 ft, whichever is smaller. If 0, program continues at event #8.
	OPR	Enter 0 or 1, and RETURN.	
7	CRT	PLOTTING DEPTH (MAX. XXXX FT):	XXXX is maximum plotting depth.
	OPR	Enter plotting depth, and RETURN.	If change has been made, program continues at event #14.
8	CRT	ENTER THE SENSOR DEPTH (MAX PLOTTING DEPTH):	
	OPR	Enter sensor depth, and RETURN.	If change has been made, program continues at event #14.
9	CRT	ENTER START RANGE (0 to 19 KYDS):	
	OPR	Enter start range, and RETURN.	If change has been made, program continues at event #14.
10	CRT	ENTER END RANGE (1 to 20 KYDS):	
	OPR	Enter end range, and RETURN.	If change has been made, program continues at event #14.

TABLE 8-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
11	CRT	ENTER UPPER RAY ANGLE (85 to 85,MINUS IS UP):	
	OPR	Enter upper ray angle, and RETURN.	If change has been made, program continues at event #14.
12	CRT	ENTER LOWER RAY ANGLE (85 to 85,PLUS IS DOWN):	
	OPR	Enter lower ray angle, and RETURN.	If change has been made, program continues at event #14.
13	CRT	ANGLE INCREMENT (.1 to 10 DEGREES) (A maximum of 100 angles are allowed):	
	OPR	Enter angle increment, and RETURN.	
14	CRT	1. PLOTTING DEPTH (MAX XXXX FT): XXXX FT 2. SENSOR DEPTH (MAX=PLOTTING DEPTH): XXX FT 3. START RANGE (0 to 19 KYDS): XX KYDS 4. END RANGE (1 to 20 KYDS): XX KYDS 5. UPPER RAY ANGLE (85 to 85, MINUS IS UP): XX DEGREES 6. LOWER RAY ANGLE (85 to 85, PLUS IS DOWN): XX DEGREES 7. ANGLE INCREMENT (.1 to 10 DEGREES): (A maximum of 100 angles are allowed) DO YOU WISH TO CHANGE ANY OF THE INPUTS? (NO=0,YES=1):	If 0, program continues at event #16.

TABLE 8-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
15	CRT	WHICH LINE DO YOU WISH TO CHANGE?	
	OPR	Enter 1, 2, 3, 4, 5, 6, or 7, and RETURN.	If response is: 1. Program continues at event #6. 2. Program continues at event #8. 3. Program continues at event #9. 4. Program continues at event #10. 5. Program continues at event #11. 6. Program continues at event #12. 7. Program continues at event #13.
16	CRT	DO YOU WISH TO ELIMINATE BOTTOM BOUNCE, SURFACE REFLECTIONS? (NO=0,YES=1) (EG. 0,0):	
	OPR	Enter 0 or 1, and RETURN	
17	CRT	Displays RAY TRACE graphics. 'BELL' rings.	
	OPR	Press LF or RETURN to continue	Program continues at event #2.
18	CRT	Displays SOUND VELOCITY PROFILE. "BELL" rings.	
	OPR	Press LF or RETURN.	
19	CRT	Screen is erased; displays "END SVP"	Program continues at event #2.

TABLE 8-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
20	CRT	NUMBER OF BOTTOM RANGE DEPTH PAIRS	
	OPR	Enter number from 2 to 50 and RETURN.	
21	CRT	BOTTOM RANGE, DEPTH PAIRS (KYD,FT), (KM,M)	xxx and yyyy are range and depth values, respectively.
	OPR	Enter range, depth pairs as follows: xxx, yyyy RETURN (etc.).	When number of pairs indicated in event #20 are entered, program proceeds to event #22. NOTE: Ranges must be entered in ascending order.
22	CRT	Displays pairs entered: LINE NUMBER RANGE DEPTH Requests: DO YOU WANT TO CHANGE ANY OF THE zz INPUT DATA SETS (1 YES, 0 NO)	zz is number of pairs entered in event #20.
	OPR	Enter 1 or 0 and press RETURN.	If response is: 0, program continues at event #2. 1, program continues at event #23.
23	CRT	NUMBER OF POINTS TO BE CORRECTED	
	OPR	Enter number of points to be changed and press RETURN.	

TABLE 8-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
24	CRT	INPUT LINE NUMBER AND CORRECT RANGE, DEPTH PAIRS	nn, xxx, yyyy are, respectively: Line number from display in event #22.
	OPR	Enter corrected values as follows: nn, xxx, yyyy RETURN (etc.).	Correct range. Correct depth. When number of points indicated in event #23 are entered, program continues at event #22.
25	CRT	DATE (DD,MM,YY) LATITUDE (DDMM) INS (1 = N, 2 = S) LONGITUDE (DDDMM) IEW (1 = W, 2 = E) NUMBER OF DATA POINTS IN PROFILE = INPUT DATA TYPE (1 = DEPTH, TEMP, SALINITY, 2 = DEPTH, VELOCITY)	If data type response is: 1, program continues at event #26. 2, program continues at event #27.
	OPR	Respond to each query as it appears and press RETURN.	
26	CRT	DEPTH, TEMP, SALINITY FEET, FAHR, PPT or METER, CENT, PPT	Units displayed depend on units selected at event #3. When number of points indicated in event #25 are entered. Program continues at event #28.
	OPR	Enter depth, temp, salinity triads as follows: DDDD.TT.T,SS.SS RETURN (etc.).	Note: Depths must be entered in ascending order.

TABLE 8-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
27	CRT OPR	DEPTH, VELOCITY FEET, FEET/SEC or METER, METER/SEC Enter depth, velocity pairs as follows: DDDD,VVVV.V RETURN (etc.).	Units displayed depend on units selected at event #3. When number of points indicated in event #25 are entered, program continues at event #28. Note: Depths must be entered in increasing order.
28	CRT OPR	Displays data entered. Requests: DO YOU WANT TO CHANGE ANY OF THE xx SVP INPUT DATA SETS (1 = YES, 0 = NO)? Enter 1 or 0 and RETURN.	xx is the number of data points entered at event #26 or #27. If response is: 0, program continues at event #32. 1, program continues at event #29.
29	CRT OPR	NUMBER OF POINTS TO BE CORRECTED Enter number and press RETURN.	If D/T/S data was input, program continues at event #30. If D/V data was input, program continues at event #31.
30	CRT OPR	INPUT LINE NUMBER AND CORRECTED D, T, S DATA SETS Enter corrected values as follows: NN,DDDD,TT.T,SS.SS RETURN (etc.).	When number of points indicated in event #29 are entered, program continues at event #28.
31	CRT OPR	INPUT LINE NUMBER AND CORRECTED D, V DATA Enter corrected values as follows: NN,DDDD,VVVV.V RETURN (etc.).	When number of points indicated in event #29 are entered, program continues at event #28.

TABLE 8-1. PROFGEN PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
32	CRT	SONIC LAYER DEPTH (METERS) or (FEET) =	Unit displayed depends on units selected at event #3.
	OPR	Enter value and press RETURN.	
33	CRT	LOW FREQUENCY (LT 1000 Hz) BOTTOM TYPE (1-9) =	
	OPR	Enter 1-9 and press RETURN.	
34	CRT	HIGH FREQUENCY (GE 1000 Hz) (BOTTOM TYPE (1-9) =	
	OPR	Enter number 1-9 and press RETURN.	Program continues at event #2.
35	CRT	END GENERAL RAY TRACE PROGRAM STOP	Program is completed; control returns to XDOS monitor.

9.0 FAST ASYMPTOTIC COHERENT TRANSMISSION (FACT) LOSS MODEL

Program execution events are described in Table 9-1.

File Name: FACT

Function: FACT is designed to provide acoustic performance estimates for both passive omnidirectional and passive vertically directional sensors. FACT consists of four basic modules: 1) Executive Module, 2) Vertical Line Array (VLA) Beam Former Model, 3) VLA Noise Model, and 4) FACT Propagation Loss Model.

The Executive Module performs the functions of data initialization, user inputs and control of the other three modules.

The VLA Beam Former Model computes the sensor beam former response as a function of vertical arrival angle, frequency and sensor type.

The VLA Noise Model calculates the noise gain for directional sensors, as a function of sensor depth, frequency and sensor type.

The FACT Propagation Loss Model computes propagation loss as a function of source/receiver depth combination, frequency and sensor type. FACT may be executed in either the omnidirectional mode or the VLA mode; however, in VLA mode, the VLA Beam Former Model must also be executed.

Input: The program reads the intermediate file, Z999ICAP:IM, containing the PROFGEN input parameters, the computed sound velocity profile, and the sonic layer depth in both English and metric units. (These parameters may have also been written by GENRAYT.) The program reads the FACT input file, Z999VINP:IM, containing the input parameters from the previous FACT execution and the model status flags. These flags indicate the models (i.e., VLA Noise, VLA Beam Former, VLA FACT, or OMNI FACT) for which output has already been computed. Figure 9-1 depicts a typical FACT input display. The operator may change any/all of the FACT input parameters. However, modification of a parameter may result in the deletion of the results of any model requiring that parameter (see Figure 9-2). Also, the operator selects the models to be executed and the desired output displays.

Output: The FACT input parameters and model status flags are written to the FACT input file, Z999VINP:IM, each time modifications occur. Results from the VLA Beam Former, VLA Noise and VLA FACT Models are written to a random access intermediate file, Z999VLAP:IM. Results from the OMNI FACT Model are written to Z999ICAP:IM for use by subsequent tactical models.

```
*** FACT INPUTS ***

     SUP FILE --------------------  2999ICAP:IM
     DATE ------------------------  11 NOV 82
     POSITION --------------------  3318N  6918W
     BOTTOM DEPTH (FT) -----------  17421.
( 1) SONIC LAYER DEPTH (FT) ------    350.
( 2) BOTTOM CLASS(LF/HF) ---------       # /  #
( 3) WAVE HEIGHT (FT) ------------       2
     AN FREQUENCIES(HZ) ----------     #     # #     # #     # #
( 4) AN LEVELS(DB//UPA/1HZ) ------    86     61      53      50
     VLA SENSOR TYPE -------------  VLA1
( 5) TARGET FREQUENCIES(HZ) ------    `#     # #
( 6) SOURCE LEVEL (DB//UPA/1HZ) --   # #     # #
( 7) RD (DB) ---------------------     #      #
( 8) VLA NOISE GAIN (DB//UPA/HZ) -     #      #
( 9) OMNI DEPTHS.... SRC(FT)------   600.
                     RCV(FT)------  1600.
(10) VLA DEPTHS..... SRC(FT)------   600.
                     RCV(FT)------  1000.
(11) MAXIMUM RANGE (KYD) ---------   100
(12) TERMINATE FACT INPUTS
SELECT OPTION (1 TO 12) :
```

Figure 9-1. FACT input display

The following console messages appear when the corresponding input is changed and any of the listed models have been previously executed:

INPUT CHANGED	OUTPUT AFFECTED	CONSOLE MESSAGE
1) SLD	VLA NOISE VLA FACT OMNI FACT	*** WARNING NOISE AND PROP LOSS DATA HAVE BEEN DELETED
2) Bottom Class	VLA NOISE VLA FACT OMNI FACT	*** WARNING NOISE AND PROP LOSS DATA HAVE BEEN DELETED
3) Wave height	VLA FACT OMNI FACT	*** WARNING OMNI AND VLA PROP LOSS DATA HAVE BEEN DELETED
4) AN Levels	VLA NOISE	*** WARNING NOISE MODEL DATA HAVE BEEN DELETED
5) Frequencies	VLA BEAM VLA NOISE VLA FACT OMNI FACT	*** WARNING ALL COMPUTED DATA HAVE BEEN DELETED
6) VLA Noise Gain	VLA NOISE	*** WARNING INPUT OF VLA NOISE GAIN WILL DELETE PRE VIOUS VLA NOISE CALCULATIONS
7) OMNI Depths	OMNI FACT	*** WARNING OMNI PROP LOSS DATA HAVE BEEN DELETED
8) VLA Depths	VLA NOISE VLA FACT	*** WARNING VLA NOISE AND PROP LOSS DATA HAVE BEEN DELETED
9) Maximum range	VLA FACT OMNI FACT	*** WARNING OMNI AND VLA PROP LOSS DATA HAVE BEEN DELETED

Figure 9 2. Console message summary

Output: (Continued)

Any of the following may be selected for output on the display screen:

1. All the beam pattern response versus frequency graphics.

2. The noise summary graphics for each VLA receiver depth.

(The following are available in either VLA or OMNI mode.)

3. A table of the FACT input parameters.

4. All the propagation loss tables at 1 kiloyard intervals.

5. The sound velocity profile.

6. The ray trace graphics for each different source depth at 100 or 200 kiloyard ranges (with a selectable depth scale for bottom depth < 10,000 ft).

7. All the propagation loss versus range graphics with optional decibel range override on one per page graphics.

8. The OMNI versus VLA detection range comparison graphic.

The sample form on the following page provides easy transfer of FACT output to end users.

Classification: Output displays coupling geographic location with bottom type are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, DON Information Security Program Regulation.

Operator Interface: Table 9 1 describes the interchange of information between the operator and the CRT/Keyboard under normal working conditions.

Execution Time: 1 to 20 minutes, depending on the model(s) selected (along with the associated parameters).

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ICAPS OMNI FACT PROP LOSS

TIME ____________ LAT ____________

PATRL AREA ____________ LONG ____________

FREQ (Hz) ________

FOM	DR	CZ1		CZ2	
RCR		SRC			
75					
85					
95					
105					
RCR		SRC			
75					
85					
95					
105					
RCR		SRC			
75					
85					
95					
105					

FREQ (Hz) ________

FOM	DR	CZ1		CZ2	
RCR		SRC			
75					
85					
95					
105					
RCR		SRC			
75					
85					
95					
105					
RCR		SRC			
75					
85					
95					
105					

FREQ (Hz) ________

FOM	DR	CZ1		CZ2	
RCR		SRC			
75					
85					
95					
105					
RCR		SRC			
75					
85					
95					
105					
RCR		SRC			
75					
85					
95					
105					

FREQ (Hz) ________

FOM	DR	CZ1		CZ2	
RCR		SRC			
75					
85					
95					
105					
RCR		SRC			
75					
85					
95					
105					
RCR		SRC			
75					
85					
95					
105					

TABLE 9 1. FACT PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R FACT	Initiates program FACT.
2	CRT	*** FACT INPUTS *** Display of SVP parameters from Z999ICAP:IM and FACT parameters from the last run. ⋮ SELECT OPTION (1 12):	
	OPR	Enter 1 12 and RETURN.	If 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12, processing continues at event #s 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 16 or 17, respectively.
3	CRT	SONIC LAYER DEPTH IN FEET (0 TO BOTTOM)	
	OPR	Enter SLD in feet and RETURN.	Processing continues at event #2.
4	CRT	BOTTOM PROVINCE (FREQ LESS THAN 1000 Hz) ENTER 1 TO 3:	
	OPR	Enter 1 3 and RETURN.	Processing continues at event #2.
5	CRT	BOTTOM PROVINCE (FREQ GREATER THAN OR EQUAL 1000 Hz) ENTER 1 TO 9:	
	OPR	Enter 1 9 and RETURN.	Processing continues at event #2.
6	CRT	WAVE HEIGHT IN FEET (0 99)	
	OPR	Enter wave height and RETURN.	Processing continues at event #2.

TABLE 9-1. FACT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
7	CRT	AMBIENT NOISE AT xxxx Hz:	Event #7 is repeated for xxxx equal to each of the standard ASRAP frequencies.
	OPR	Enter AN and RETURN.	After last input, processing continues at event #2.
8	CRT	NUMBER OF FREQUENCIES (1-4) :	Event #9 is repeated 1-4 times, depending on response.
	OPR	Enter number of frequencies to be specified and RETURN.	
9	CRT	ENTER FREQUENCIES IN ASCENDING ORDER (1 TO 5000 Hz) FREQUENCY IN Hz	
	OPR	Enter frequency in Hertz and RETURN.	After last input, processing continues at event #2.
10	CRT	SOURCE LEVEL AT xxxx Hz:	Event #10 is repeated 1-4 times, depending on response to event #8. xxxx is equal to the frequencies input in event #9.
	OPR	Enter SL and RETURN.	After last input, processing continues at event #2.
11	CRT	ENTER RD AT xxxx Hz:	See explanation in event #10.
	OPR	Enter RD and RETURN.	After last input, processing continues at event #2.
12	CRT	ENTER ARRAY GAIN AGAINST NOISE (-30 TO 30 DB) (NEGATIVE VALUES INDICATE GAIN) ARRAY GAIN AT xxxx Hz:	See explanation in event #10.
	OPR	Enter AG and RETURN.	After last input, processing continues at event #2.

TABLE 9-1. FACT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
13	CRT	NUMBER OF OMNI SENSOR SOURCE RECEIVER DEPTH PAIRS (1-3):	Event #15 is repeated 1-3 times, depending on response.
	OPR	Enter number of S/R depth pairs and RETURN.	
14	CRT	NUMBER OF VLA SENSOR SOURCE-RECEIVER PAIRS (1-3):	Event #15 is repeated 1-3 times, depending on response.
	OPR	Enter number of S/R depth pairs and RETURN.	
15	CRT	SOURCE DEPTH IN FEET (1 TO BOTTOM-2) RECEIVER DEPTH IN FEET (1 TO BOTTOM-2) =	
	OPR	Enter source depth, RETURN, receiver depth, RETURN.	After last input, processing continues at event #2.
16	CRT	MAX RANGE IN KYD (1-200):	
	OPR	Enter maximum range in kiloyards and RETURN.	Processing continues at event #2.
17	CRT	*** FAST ASYMPTOTIC COHERENT TRANSMISSION (FACT) LOSS MODEL *** OPTIONS: (1) INPUTS (2) VLA BEAM PATTERN (3) VLA NOISE MODEL (4) OMNI FACT PROP LOSS MODEL (5) VLA FACT PROP LOSS MODEL (6) TERMINATE FACT (7) OMNI VS VLA COMPARE X INDICATES OUTPUT ALREADY COMPUTED ENTER OPTION (1-7):	Once an option has been executed, an 'x' is placed beside it to indicate that the output has been stored for subsequent redisplay.

TABLE 9 1. FACT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
	OPR	Enter 1 7 and RETURN.	If 1, 2, 3, 4, 5, 6, or 7, processing continues at event #s 2, 18, 20, 22, 24, 37 or 38, respectively.
18	CRT	*** THE VLA BEAM PATTERN MODEL IS EXECUTING PLEASE STAND BY ***	When calculations are complete, processing continues at event #19.
19	CRT	Graphic displays of vertical beam pattern response for each frequency specified in event #9.	When bell rings, display is complete.
	OPR	Press LF or RETURN to continue.	Press LF for hard copy or RETURN. When last display is complete, processing continues at event #2.
20	CRT	*** THE VLA NOISE MODEL IS EXECUTING PLEASE STAND BY! ***	When calculations are complete, processing continues at event #21.
21	CRT	Graphic displays of noise summary for each VLA receiver depth specified in event #s 14 and 15.	When bell rings, display is complete.
	OPR	Press LF or RETURN to continue.	Press LF for hard copy or RETURN. When last display is complete, processing continues at event #2.
22	CRT	*** OMNI FACT IS EXECUTING PLEASE STAND BY! ***	
		*** FACT PROP LOSS COMPLETED ***	Calculations now complete. Program halts, bell rings.
	OPR	Press RETURN to continue.	

TABLE 9-1. FACT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
23	CRT	*** OMNI PROP LOSS *** ENTER RUN IDENTIFIER (0 TO 20 CHARACTERS):	An identifying label may be entered.
	OPR	Enter label (if desired) and RETURN.	Processing continues at event #26.
24	CRT	*** VLA FACT IS EXECUTING PLEASE STAND BY! ***	
		*** FACT PROP LOSS COMPLETED ***	Calculations are now complete. Program halts, bell rings.
	OPR	Press RETURN to continue.	
25	CRT	*** VLA PROP LOSS *** ENTER RUN IDENTIFIER (0 TO 20 CHARACTERS):	
	OPR	Enter label (if desired) and RETURN.	
26	CRT	DO YOU WISH TO DISPLAY THE FACT INPUT PARAMETERS? (0 = NO, 1 = YES)	Regardless of input in events 26-29, continue synchronously. Data appear in event #33.
	OPR	Enter 0 or 1 and RETURN.	
27	CRT	DO YOU WISH TO DISPLAY THE PROPAGATION LOSS VALUES AS CALCULATED IN FACT? (0 = NO, 1 = YES)	
	OPR	Enter 0 or 1 and RETURN.	
28	CRT	DO YOU WISH TO DISPLAY THE SOUND VELOCITY PROFILE? (0 = NO, 1 = YES)	
	OPR	Enter 0 or 1 and RETURN.	

TABLE 9 1. FACT PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
29	CRT	DO YOU WISH TO DISPLAY THE RAYTRACE GRAPHICS? (0 NO, 1 YES WITH 0 100 KYD RANGE, 2 YES WITH 0 200 KYD RANGE)	If 0, processing continues at event #33. If nonzero and bottom depth 10000 feet, processing continues at event #33.
	OPR	Enter 0, 1, or 2 and RETURN.	
30	CRT	BOTTOM DEPTH XXXXX FT.	Bottom depth appears in XXXXX (selected or defaulted in PROFGEN). If bottom depth 2000, processing continues at event #32.
31	CRT	RAYTRACE DEPTH OPTIONS ARE 10000 OR 20000 FT. INPUT 1 FOR 10000 OR 2 FOR 20000:	Processing continues at event #33.
	OPR	Enter 1 or 2 and RETURN.	
32	CRT	RAYTRACE DEPTH OPTIONS ARE 2000, 10000, OR 20000 FT. INPUT 1 FOR 2000, 2 FOR 10000, OR 3 FOR 20000:	
	OPR	Enter 1, 2, or 3 and RETURN.	
33	CRT	DO YOU WISH TO DISPLAY THE PROPAGATION LOSS GRAPHICS? (0 NO, 1 YES, ONE PER PAGE, 2 YES, TWO PER PAGE)	Choice of 0 or 2 forfeits DB override option; processing continues at event #36.
	OPR	Enter 0, 1, or 2 and RETURN.	
34	CRT	DO YOU WISH TO OVERRIDE 40 120 DB RANGE? (0 NO, 1 YES)	If 0, processing continues at event #36.
	OPR	Enter 0 or 1 and RETURN.	

TABLE 9 1. FACT PROGRAM (Concluded)

Event	Source	Statement/Operator Action	Comment
35	CRT	INPUT LOWER AND UPPER DB VALUES	Enter lower and upper DB values separated by a comma.
	OPR	Enter lower value, upper value and RETURN.	
36	CRT	Graphic or tabular display of requested option.	Desired graphics appear as requested. When bell rings display is complete.
	OPR	Press LF or RETURN to continue.	Press LF for hard copy or RETURN.
			Event repeats until all selected options have been displayed. When last dis play is complete, processing continues at event #2.
37	CRT	OMNI VS VLA DETECTION RANGE COMPARISON ⋮	
		Graphic display of OMNI vs VLA detection ranges for selected/ receiver and frequency combina tions.	When bell rings, display is complete.
	OPR	Press LF or RETURN to continue.	Press LF for hard copy or RETURN. When display is complete, processing con tinues at event #2.
38	CRT	*** FACT TERMINATED BY USER ***	
		STOP	Program halts. Control returns to XDOS.

13.0 SHIPS HELICOPTER ACOUSTIC RANGE PREDICTION SYSTEM

The Ships Helicopter Acoustic Range Prediction System (SHARPS III) is an environmental acoustic model designed to provide detection range forecasts for a wide variety of sonar systems, installations, and operating modes. Capability exists within the model to predict direct path, bottom bounce, and convergence zone detection ranges for active sonars and counter detection ranges for the detection of active sonars by enemy passive sonars. The capability also exists for making detection range predictions for active sonars operating in the passive mode. The model is equipped to handle hull mounted, variable depth, and helicopter dipping sonars.

SHARPS III consists of two programs, the preprocessor and the main program. The preprocessor converts input sonar system and electronic data into a computer oriented sonar description table. The main program uses this table and input environmental data to process the acoustic routines and arrive at detection range predictions. The lines of the sonar description table contain all the sonar system related information needed by the main program to produce the forecast. In addition, the lines direct the flow of the processing in the main program and are arranged so that maximum use can be made of previously performed calculations, thus minimizing the program execution time. Input data is obtained from a pre-established sonar system, electronic, and self noise data file, and ICAPS environmental data file, and operator inputs. SHARPS III output is in the form of a detection range forecast message which summarized the predictions for the user selected suite of sonars and ocean environment.

13.1 SHIPS HELICOPTER ACOUSTIC RANGE PREDICTION SYSTEM PREPROCESSOR (USER)

Program execution events are described in Table 13-1.

File Name: USER

Function: Convert sonar system and electronic data into a computer oriented sonar description table which is used along with environmental data by SHARPS to process the acoustic routines and arrive at detection range predictions.

Input: The program reads the sonar parameter input file, SHPDATA, which contains sonar system, electronic, and self-noise data. The operator specifies the sonar types to be included in the suite of sonars used in the execution of SHARPS.

Output: The operator specified sonar suite and associated data is stored in the file Z9SONDES:TB.

Classification: Output displays detailing operational capabilities of specific sonars are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, DON Information Security Program Regulation.

Operator Interface: The conversational format and operating sequence in table 13-1 describes the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: 20 seconds to 3 minutes.

TABLE 13-1. USER PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R USER	Initiates preprocessor.
2	CRT	***SHARPS PREPROCESSOR (USER)*** ENTER SHARPS RUN IDENTIFIER (0 TO 20 CHARACTERS):	
	OPR	Enter identifier and RETURN.	
3	CRT	SYSTEM SONAR CODES DO YOU WISH TO CHANGE SONAR SUITE? (0 = NO, 1 = YES):	If response is 0 (NO) processing continues at event #5.
	OPR	Enter 0 or 1 and RETURN.	
4	CRT	SELECT THE SONARS TO BE INCLUDED IN THE RANGE PREDICTION MESSAGE: RESPOND WITH 1 FOR YES, 0 FOR NO	Sonar types are specified individually. Prompt repeats for each sonar type. Processing continues at event #3.
	OPR	Enter 1 or 0 and RETURN.	
5	CRT	THE SHARPS PREPROCESSOR IS EXECUTING. PLEASE STAND BY.	
6	CRT	THE UNSORTED TABLE AND THE ASSOCIATED TITLE, LINE AND NOISE TABLES HAVE BEEN COMPLETED. THE TABLE WILL BE SORTED AND THE COMPLETE SONAR DESCRIPTION TABLE WILL BE CREATED. PLEASE STAND BY!!	

TABLE 13-1. USER PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
7	CRT	SHARPS PREPROCESSOR COMPLETED SUCCESSFULLY. DO YOU WISH TO EXECUTE SHARPS? (0 NO, 1 YES)	If response is 1 (YES), processing continues at event #2 of the SHARPS operating procedures. If no, program terminates.

13.2 SHIPS HELICOPTER ACOUSTIC RANGE PREDICTION SYSTEM (SHARPS III)

Program execution events are described in Table 13-2

File Name: SHARPS

Function: Produce a forecast summarizing the detection-range predictions for a user selected suite of sonars and ocean environment.

Input: The program reads the sonar description file, Z9SONDES:TB, which was created by the SHARPS preprocessor. The intermediate file Z999ICAP:IM is read to obtain depth, temperature, salinity, and sound speed data. The low frequency bottom type and the high frequency bottom type are also read from the intermediate file. The operator has the option of changing the bottom types. Default values are provided by the program for scattering coefficients, target strength, and probability of detection. The operator may select values other than the default values. Target and sonar depths are selected by the program unless specified by the user.

Output: A detection range forecast is produced.

Classification: Output displays detailing operational capabilities of specific sonars are classified CONFIDENTIAL. Hard copies of these displays should be marked and handled in accordance with OPNAVINST 5510.1F, DON Information Security Program Regulation.

Operator Interface: The conversational format and operating sequence in table 13-2 describe the interchange of information between the operator and the CRT/keyboard under normal conditions.

Execution Time: 2 1/2 minutes to 10 minutes.

TABLE 13-2. SHARPS III PROGRAM

Event	Source	Statement/Operator Action	Comment
1	OPR	R SHARPS	Initiates program.
2	CRT	***SHIPS HELICOPTER ACOUSTIC RANGE PREDICTION SYSTEM (SHARPS) III*** ENTER SHARPS RUN IDENTIFIER (0 TO 16 CHARACTERS).	If a sonar description file was not created by the SHARPS preprocessor, proc essing continues at event #5.
	OPR	Enter run identifier and RETURN.	
3	CRT	***SHIPS HELICOPTER ACOUSTIC RANGE PREDICTION SYSTEM (SHARPS) III*** CURRENT SHARPS SUITE. o o o DO YOU WISH TO CHANGE SONAR SUITE? (0 = NO, 1 = YES)	If response is 0 (NO), proc essing continues at event #7.
	OPR	Enter 0 or 1 and RETURN.	
4	CRT	***WARNING*** CHANGING THE ABOVE SONAR SUITE REQUIRES EXECUTING THE SHARPS PREPROCESSOR. THIS PROCESS CREATES A NEW SONAR DESCRIPTION TABLE.	
5	CRT	DO YOU WISH TO EXECUTE THE SHARPS PREPROCESSOR? (0 = NO, 1 = YES)	If response is 1 (YES), proc essing continues at event #2 of the SHARPS preprocessor operating procedures Table 13-1.
	OPR	Enter 0 or 1 and RETURN.	If response is 0 (NO) and a sonar description file was not created by the SHARPS pre processor, the program terminates.

TABLE 13-2. SHARPS III PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
6	CRT	DO YOU WISH TO TERMINATE SHARPS? (0 = NO, 1 = YES)	If response is 0 (NO), processing continues at event #3. If response is 1 (YES), program terminates.
	OPR	Enter 0 or 1 and RETURN.	
7	CRT	***SHARPS DATA INPUTS*** WAVE HEIGHT (0 TO 50 FEET)=	
	OPR	Enter wave height and RETURN.	
8	CRT	WIND SPEED (0 TO 50 KNOTS)=	
	OPR	Enter wind speed and RETURN.	
9	CRT	LOW FREQUENCY BOTTOM TYPE = X DO YOU WISH TO CHANGE BOTTOM TYPE? (0 = NO, 1 = YES)	If response is 0 (NO), processing continues at event #11.
	OPR	Enter 0 or 1 and RETURN.	
10	CRT	LOW FREQUENCY BOTTOM TYPE (1-9)=	
	OPR	Enter low frequency bottom type and RETURN.	
11	CRT	HIGH FREQUENCY BOTTOM TYPE = X. DO YOU WISH TO CHANGE BOTTOM TYPE? (0 = NO, 1 = YES)	If response is 0 (NO), processing continues at event #13.
	OPR	Enter 0 or 1 and RETURN.	

TABLE 13-2. SHARPS III PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
12	CRT	HIGH FREQUENCY BOTTOM TYPE (1-9)=	
	OPR	Enter high frequency bottom type and RETURN.	
13	CRT	VOLUME SCATTERING COEFFICIENTS (DB PER SQUARE YD) DEFAULT VALUES = -66 (LOW FREQUENCY), -60 (HIGH FREQUENCY)	
		DO YOU WISH TO CHANGE COEFFICIENTS? (0 = NO, 1 = YES)	If response is 0 (NO), processing continues at event #16.
	OPR	Enter 0 or 1 and RETURN.	
14	CRT	LOW FREQUENCY SCATTERING COEFFICIENT (-80 TO -30 DB)=	
	OPR	Enter low frequency scattering coefficient and RETURN.	
15	CRT	HIGH FREQUENCY SCATTERING COEFFICIENT (-80 TO -30 DB)=	
	OPR	Enter high frequency scattering coefficient and RETURN.	
16	CRT	DEFAULT TARGET STRENGTH = 15 DB.	
		DO YOU WISH TO CHANGE? (0 = NO, 1 = YES)	If response is 0 (NO), processing continues at event #18.
	OPR	Enter 0 or 1 and RETURN.	

TABLE 13-2. SHARPS III PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
17	CRT	TARGET STRENGTH (35 TO 50 DB)=	
	OPR	Enter target strength and RETURN.	
18	CRT	DEFAULT PROBABILITY OF DETECTION = 50% DO YOU WISH TO CHANGE? (0 = NO, 1 = YES)	If response is 0 (NO), processing continues at event #20.
	OPR	Enter 0 or 1 and RETURN.	
19	CRT	PROBABILITY OF DETECTION (0 TO 100)	When bell rings press LF for hard copy or press RETURN.
	OPR	Enter probability of detection and RETURN.	
20	CRT	***SHARPS INPUT*** DO YOU WISH TO CHANGE ANY OF THE ABOVE INPUTS? (0 = NO, 1 = YES)	Input values are displayed. If response is 1 (YES), processing continues at event #7.
	OPR	Enter 0 or 1 and RETURN.	
21	CRT	***SHARPS TARGET/SONAR DEPTH INPUTS*** SHARPS SELECTS TARGET AND SONAR DEPTHS UNLESS SPECIFIED BY THE USER. DO YOU WISH TO ENTER TARGET AND/OR SONAR DEPTHS? (0 = NO, 1 = YES)	If response is 0 (NO), processing continues at event #24.
	OPR	Enter 0 or 1 and RETURN.	

TABLE 13-2. SHARPS III PROGRAM (Continued)

Event	Source	Statement/Operator Action	Comment
22	CRT	ENTER 0 FOR THOSE DEPTHS YOU WANT SHARPS TO SELECT. OTHERWISE ENTER DESIRED DEPTHS: SHALLOW TARGET DEPTH (FEET)= DEEP TARGET DEPTH (FEET)= HULL MOUNTED SONAR DEPTH (FEET) HELO DIPPING SONAR DEPTH (FEET)= VARIABLE DEPTH SONAR DEPTH #1 (FEET)= VARIABLE DEPTH SONAR DEPTH #2 (FEET)	
	OPR	Enter 0 or depth value for each prompt and RETURN.	
23	CRT	***SHARPS TARGET AND SONAR DEPTH INPUTS*** DO YOU WISH TO CHANGE ANY OF THE ABOVE DEPTH? (0 = NO, 1 = YES)	Input values from event #22 are displayed. If response is 1 (YES), processing continues at event #22.
	OPR	Enter 0 or 1 and RETURN.	
24	CRT	SHARPS DATA INPUT IS COMPLETE. PLEASE STAND BY FOR SHARPS EXECUTION.	
25	CRT	***SHIPS HELICOPTER ACOUSTIC RANGE PREDICTIONS***	Program terminates when range predictions have been displayed.

20.0 QANTEX TAPE UNIT UTILITIES

The Qantex provides an easy and reliable method for storage of environmental and system data. It can also be used as a means of loading system diagnostic programs independently of the disk. A description of data storage and retrieval using the Qantex follows. Special Qantex procedures are included.

20.1 GENERAL DESCRIPTION

The Qantex utilizes the 3M Data Cartridge as the storage medium. The specifications required to order additional cartridges are:

Data Cartridge (3M DC 300A, ITC TC 2000, WABASH Quadronix)
Tape Computer grade magnetic tape-length 300 ft. of usable storage.

Cartridges are equipped with a write protect switch. Positioning the write protect switch to "SAFE" prevents any writing to the cartridge.

Each cartridge consists of four (4) tracks. Tracks can be accessed independently of each other, (i.e., a read or write operation on one track does not affect the other tracks). Files are referenced by file and track numbers; e.g., 2:1/CTU0 would refer to file 2 of track 1. The device name for the Qantex Unit is CTU0. Files are written sequentially (file 1 must exist in order to create file 2). File zero (0) represents the beginning file of each track.

There are two different formats for transferring data from the disk to the cartridge, OUTPUT format and COPY format. OUTPUT format writes file names, protection flags (if any), and contents of each file specified to cartridge. If files are written to cartridge with an OUTPUT command, they are restored to disk with an INPUT command.

Examples: -OUTPUT @:PR,0:1/CTU0,L writes to file 0 of track 1 of the cartridge, in output format, all files on the system device having the extension PR. The names of the files output will be listed on the operator's console.

-INPUT 0:1/CTU0,,AOF,L returns to the system device, all files stored in output format on file 0 of track 1. The files will be defined on the disk if necessary or if they already exist, data will be written over the existing data. A listing of the files written to the system device will appear on the operator's console as each file is input.

-OUTPUT MED:PR/XDP1,1:1/CTU0
Outputs the file MED:PR on device /XDP1 to file 1 of track 1.

COPY format copies the entire contents of one file to another file. Unlike the OUTPUT format, file names, and protection flags are not issued. Files that are copied to cartridge can only be returned to the disk with a COPY command.

Example: >>COPY BY37:PR,3:3/CTU0
Copies the contents of BT37:PR to file 3 of track 3.

>>COPY 3:3/CTU0,BT37:PR
Copies the contents of file 3 of track 3 to the predefined disk file, BT37:PR.

20.2 QANTEX BOOTLOADER

The following describes the procedure used to create the Qantex bootloader on cartridge. Instructions to load the bootloader using the panel switches are provided also. These procedures are essential in duplicating the system diagnostic cartridge and generating the system from cartridge.

I. Creating the bootloader

1. Insert blank cartridge with write protect switch set to "NOT SAFE".

2. >>RUN QTBLGN
   Input 22 and press return when the system requests "DEVICE ADDRESS=".

3. The system will respond "READY UNIT 0". Set the track select switch to the desired track and press return. This step is repeated if the operator wishes to generate the bootloader on other tracks. Otherwise, set the track select switch to "OFF" and press CONTROL - D to terminate the program.

II. Loading the Qantex bootloader

1. After inserting a cartridge which has a bootloader on file 0 (created by QTBLGN) into the drive unit, manually set the following memory locations using the switch register (detailed procedure in Section 3.6):
   octal location 376: 60122_8
   octal location 377: 377_8

2. Set the switch register to octal location 376

3. Press RESET and START. This will load the bootloader program from file 0 and cause the computer to halt at octal location 77000. The address panel will display octal 77001.

4. The bootloader can then be used to load programs from any subsequent files on the tape into memory. To do so, set the low order switches (13-15) to the number of the file desired and press CONTINUE.

20.3 DIAGNOSTIC DATA CARTRIDGE DUPLICATION PROCEDURE

1. Insert DIAGNOSTIC CARTRIDGE with write protect switch set to "SAFE".

2. >>IP 0:4/CTU0,,AOF,L

3. >>AC TAPE:AC

4. Remove DIAGNOSTIC CARTRIDGE

5. Insert blank cartridge with write protect switch set to "NOT SAFE".

6. Execute the bootloader generator, QTBLGN on tracks 1 and 3 as described in section on creating the bootloader.

7. ··AC TAPEDUP:AC

Contents of Diagnostic Data Cartridge

TRACK 1

file	
0	Bootloader (QANTEX)
1	System Loader
2	DFMDIAG
3	DIAADR
4	DIAARITH
5	DIACKB:4
6	DIAINST
7	DIALOG
8(10_8)	DIAMUDV
9(11_8)	DIATELET
10(12_8)	DFMCPY:AB

TRACK 3

file	
0	Bootloader (QANTEX)
1	System Loader
2	XFLBGN:AB
3	XFLDGN:AB
4	XFMNGNQ:AB
5	XFEXGN:AB
6	XFDRGN:AB

TRACK 2

file (OUTPUT FORMAT)

0 All files of track 1
including the following:
QTUL
QTBLGN
QANTEST
DFMCPY

TRACK 4

file (OUTPUT FORMAT)

0 All files of track 3
including the following
XFLBGN
XFLDGN
XFMNGNQ
XFEXGN
XFDRGN
TAPE :AC
BACKUP

20.4 SYSTEM GENERATION FROM QANTEX TAPE

The following describes the procedure used to generate XDOS from the system generation cartridge. This special tape includes both XEBEC system generation software and ICAPS software. Track 1 of the cartridge consists of these files:

File	0	Bootloader program
	1	Label Generator program
	2	Loader Generator program
	3	Monitor Generator program
	4	Executive Generator program
	5	Directory Generator program
	6	SYSTEM:AC
	7	Start of ICAPS software

INSTRUCTIONS

1. Load the Qantex bootloader using the switch register as described in the section on loading the bootloader.

II. Executing the system generation programs

The following instructions are to be executed for the programs in files 1 through 5.

1. Hit STOP and RESET.

2. Set the switch register to octal 77000 and press START. The computer will halt immediately.

3. Set the low order (13 15) switches to the octal number of the file to be loaded. Hit CONTINUE to load and execute the program in that file.

4. Execute the program in accordance with the instructions given in Section IV.

5. When the fifth program has been executed, hit STOP and load XDOS from the platter to be generated.

III. Loading the ICAPS software

1. Load the program SYSTEM:AC with the command >>IP 6:1/CTU0, /XDPO,UF,L.

2. Load the ICAPS software with the command >>AC SYSTEM:AC.

IV. Details of the system generation programs

The descriptions below consist of the queries by the programs and the user responses that should be input to generate a system in the format used by ICAPS. In several programs, the default values are used entirely, with two exceptions:

(1) the query "FMPRM" must be given value "F2."

(2) "PCKNO" must be given the value "0" if the removable platter is to be generated, or the value "1" if the fixed platter is to be generated.

It is important that these values be used in all of the programs. Also, the query "PCKNO" will be displayed after the program has executed successfully; entering "control-D" causes the program to halt.

A default value is selected by striking the return key when the query appears. A dash is used below to denote a default value.

1. Label Generator
   default values used

2. Loader Generator
   default values used

3. Monitor Generator

Query	Response
FMPRM?	F2
NFLSL?	6
KOCIAD?	
KOCOAD?	
KCDCAD?	
KCDLNL?	73.
KCDPGL?	35.
KGDCAD?	
KHCCAD?	
KHCLNL?	73.
KHCPGL?	35.
KKBCAD?	
TKICAD?	
TPOCAD?	
TPOLNL?	
TPOPGL?	
TTPCAD?	
TTRCAD?	
QCTCAD?	22
QCTORL?	
QCTMIL?	
XFSCAD?	
XFSCAW?	
PARAMETERS?	Y
PCKNO?	0 or 1

(Values not shown here are output between several of the queries.)

4. Executive Generator
default values used

5. Directory Generator

Query	Response
FMPRM?	F2
NFDEN?	
LSCYL?	203.
PARAMETERS?	Y
PCKNO?	0 or 1
OVERRIDE?	Y

20.5 ICAPS ATLAS STRUCTURE

The ICAPS Historical Atlas data and TXBT data are stored on four cartridges. There is a separate cartridge for the Atlantic, the Pacific, the Indian, and the Mediterranean. The ICAPS Atlas data retrieval process requires that the Atlas file for the area of interest reside on the disk. An

attempt to retrieve data from an Atlas file that is not on the disk results in the error message: ***ATLAS SOUGHT NOT ON PLATTER***. Due to disk storage limitations, all of the ICAPS Atlases cannot reside on the disk simultaneously. However, the Atlas cartridge allows the operator to select individual Atlas files for use when needed.

The first file on each tape describes the naming convention used for Atlas file names, lists a directory of the files on the tape, and specifies the procedure for loading the Atlas files from the tape. This instruction file is written to the tape in a copy format and can be read by executing the following command:

C 0:1/CTU0,/CDT

The subsequent files contain Atlas data and are written to the tape in an OUTPUT format. Each tape file consists of the six disk files containing the information for one ICAPS area. These six files include the four seasonal files, the auxiliary file, and the TXBT file. The command to load the six files for one area from the tape to the disk is:

IP (File #):(Track #)/CTU0,,AOF,L.

Example: The following steps are required in order to bring the Atlantic Area A files in from tape.

1. Insert Atlantic Atlas Cartridge with its write inhibit indicator set to "SAFE".

2. Set write inhibit switch on disk drive to "OFF" for the disk pack to be copied to.

3. Type the following XDOS command on the console.

   IP 0:2/CTU0,,AOF,L

4. When finished transferring Atlas file(s) to disk, remove cartridge and return to safe place for future reference.

ATLANTIC TAPE DIRECTORY

FILE	TRACK	AREA
0	2	A
0	3	B
0	4	C
1	1	D
1	2	E
1	3	F

DISTRIBUTION LIST

ACTIVITY		TOTAL # COPIES
CNO (OP 952, 952D1)		2
COMNAVOCEANCOM		1
COMAREASWFORSIXTHFLT		1
COMSUBFORSIXTHFLT		1
COMPATWINGSLANT		1
COMPATWINGSPAC		1
COMSEABASEDASWWINGSLANT		1
COMASWWINGPAC		1
CNET		1
FLECOMBATRACENLANT (ASWM/ASWOC School)		20
FLECOMBATRACENPAC (ASWM/ASWOC School)		1
FLEASWTRACENLANT		1
FLEASWTRACENPAC		1
NAVPGSCOL		1
NAVWARCOL		1
NAVOCEANCOMDET Monterey (Attn: GTRL)		1
COMNAVAIRDEVCEN (203, Library)		2
COMNAVAIRSYSCOM (370P, Library)		2
COMNAVSEASYSCOM (63D5, Library)		2
NAVSEACOMBATSYSENGSTA		1
MASWSPO		2
CTF SIX SIX		2
CTF SIX SEVEN		2
USS AMERICA	(ATTN: ASW Module)	2
USS CONSTELLATION	(ATTN: ASW Module)	2
USS DWIGHT D. EISENHOWER	(ATTN: ASW Module)	2
USS ENTERPRISE	(ATTN: ASW Module)	2
USS FORRESTAL	(ATTN: ASW Module)	2
USS INDEPENDENCE	(ATTN: ASW Module)	2
USS JOHN F. KENNEDY	(ATTN: ASW Module)	2
USS KITTY HAWK	(ATTN: ASW Module)	2
USS MIDWAY	(ATTN: METRO)	2
USS NIMITZ	(ATTN: ASW Module)	2
USS RANGER	(ATTN: ASW Module)	2
USS SARATOGA	(ATTN: ASW Module)	2
USS CARL VINSON	(ATTN: ASW Module)	2

ASW OPERATIONS CENTERS

Adak, AK	2	Agana, GU	2
Barbers Pt, HI	2	Bermuda	2
Brunswick, ME	2	Cecil Field, FL	2
Cubi Point, RP	2	Jacksonville, FL	2
Kadena, JA	2	Keflavik, IC	2
Lajes, AZ	2	Misawa, JA	2
Moffett Field, CA	2	North Island, CA	2
Patuxent River, MD	2	Rota, SP	2
Sigonella, IT	2		
DTIC			12

ATE

LMED

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